Workshop Manual

Octavia II 2004 ➤ , Octavia II 2010 ➤ , Superb II 2008 ➤ , Superb II 2011 ➤ , Yeti 2010 ➤ , Yeti 2011 ➤

2.0/81; 103; 125 kW TDI CR Engine (2nd generation)									
Engine ID	CFHF	CLCA	CFHC	CLCB	CLJA	CFFB	CFGB	CFHA	CFJA

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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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00 – Technical data

1 Denomination

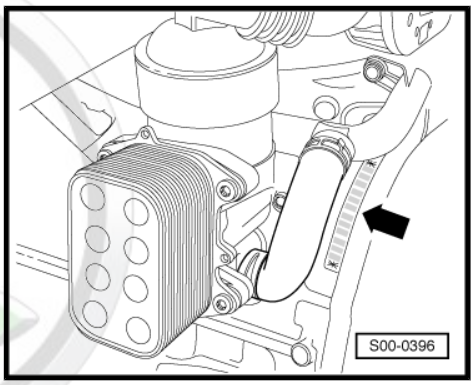
(SRL001430; Edition 07.2019)

⇒ “1.1 Engine number”, page 1

⇒ “1.2 Engine characteristics”, page 1

1.1 Engine number

The engine number (“engine identification characters” and “serial number”) is located at the engine/gearbox joint -arrow-.



In addition, a sticker with the “engine identification characters” and “serial number” is attached to the timing belt guard.

The engine identification characters are also indicated on the vehicle data sticker.

- Starting with the letter “C”, new four digit engine codes have been introduced.
- The first 3 digits of the engine identification characters refer to the displacement and the mechanical construction of the engine. They are type-punched on the cylinder block including the serial number.
- The 4th digit refers to the output and torque of the engine and depends upon the engine control unit.

1.2 Engine characteristics

⇒ “1.2.1 81 kW engine”, page 1

⇒ “1.2.2 103 kW engine”, page 2

⇒ “1.2.3 125 kW engine”, page 2

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1.2.1 81 kW engine

Engine codes		CFHA	CFHF	CLCA
Manufactured	Octavia II	---	01.2011 ► 04.2013	03.2010 ► 06.2013
	Yeti	11.2009 ► 05.2015	11.2009 ► 05.2015	11/2011 ►
Emission standards conforming to		EU-5	EU-5	EU-4/BS-4
Displacement	l	1.968	1.968	1.968
Output	kW at rpm	81- 4200	81- 4200	81- 4200
Torque	Nm at rpm	250/1500…2500	280/1500…2500	250/1500… 2500
Bore	∅ mm	81	81	81
Stroke	mm	95.5	95.5	95.5
Number of cylinders/valves per cylinder		4- 4	4- 4	4- 4
Compression ratio		16.5	16.5	16.5
Firing order		1-3-4-2	1-3-4-2	1-3-4-2
Catalytic converter		yes	yes	yes
Particle filter		yes	yes	no 1)
Exhaust gas recirculation with radiator		yes	yes	yes
Turbocharging		yes	yes	yes
Charge air cooler		yes	yes	yes

Engine codes	CFHA	CFHF	CLCA
Balancing shaft module	no	no	no

1) Particle loss system instead of particle filter.

1.2.2 103 kW engine

Engine codes		CFFB	CFHC	CLCB	CLJA
Manufactured	Octavia II	---	05.2010 ► 02.2013	03.2010 ► 06.2013	---
	Superb II	03.2010 ► 08.2015	---	---	03.2010 ► 08.2015
	Yeti	---	11.2009 ► 05.2015	05.2010 ► 05.2014	---
Emission standards conforming to		EU-5	EU-5	EU-4/BS-4	EU-4/BS-4
Displacement	l	1.968	1.968	1.968	1.968
Output	kW at rpm	103- 4200	103- 4200	103- 4200	103- 4200
Torque	Nm at rpm	320/1750… 2500	320/1750 - 2500	320/1750 - 2500	320/1750… 2500
Bore	∅ mm	81	81	81	81
Stroke	mm	95.5	95.5	95.5	95.5
Number of cylinders/valves per cylinder		4- 4	4- 4	4- 4	4- 4
Compression ratio		16.5	16.5	16.5	16.5
Firing order		1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Catalytic converter		yes	yes	yes	yes
Particle filter		yes	yes	no 1)	no 1)
Exhaust gas recirculation with radiator		yes	yes	yes	yes
Turbocharging		yes	yes	yes	yes
Charge air cooler		yes	yes	yes	yes
Balancing shaft module		yes	no	no	yes

1) Particle loss system instead of particle filter.

1.2.3 125 kW engine

Engine codes		CFGB	CFJA
Manufactured	Superb II	06.2010 ► 08.2015	---
	Yeti	---	05.2010 ► 05.2015
Emission standards conforming to		EU-5	EU-5
Displacement	l	1.968	1.968
Output	kW at rpm	125- 4200	125- 4200
Torque	Nm at rpm	350/1750…2500	350/1750 - 2500
Bore	∅ mm	81	81
Stroke	mm	95.5	95.5
Number of cylinders/valves per cylinder		4- 4	4- 4
Compression ratio		16.5	16.5
Firing order		1-3-4-2	1-3-4-2
Catalytic converter		yes	yes
Particle filter		yes	yes

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Engine codes	CFGB	CFJA
Exhaust gas recirculation with radiator	yes	yes
Turbocharging	yes	yes
Charge air cooler	yes	yes
Balancing shaft module	yes	no

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2 Safety instructions

⇒ "2.1 Safety precautions when working on fuel supply system", page 4

2.1 Safety precautions when working on fuel supply system

WARNING

When undertaking all assembly work, particularly in the engine compartment due to its cramped construction, please observe the following:

- *Install lines of all kinds so that the original routing can be restored.*
- *Ensure that there is adequate free access to all moving or hot components.*
- *The fuel or the fuel lines in the fuel system can become very hot (risk of burning)!*
- *The fuel system is under pressure!*
- *Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel.*
- *Place cleaning cloths around the connection point before detaching cable connections. Reduce pressure by carefully removing the wiring.*

For reasons of safety, the power supply to the fuel pump must be interrupted before the fuel system is opened. The fuel pump would otherwise be activated when the driver's door is opened. One of the following options must be used to interrupt the current supply:

- *Disconnect battery*

or

- *Take out fuse for fuel pump relay - J17- ,*

or

- *Pull connector off fuel delivery unit flange.*

Caution

In order to avoid the high pressure pump to run dry and to achieve a quick engine start after parts are replaced, the following points must be observed:

- *If fuel system between tank and pump parts/components have been removed or replaced the fuel system must be filled/bled before the engine is started up for the first time ⇒ "1.3 Filling/bleeding the fuel system", page 266 .*
- *If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start ⇒ "1.3 Filling/bleeding the fuel system", page 266 .*
- *If the high pressure system was opened, it must be checked for tightness ⇒ "2.4 Check the fuel system for tightness", page 276 .*

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When removing and installing the fuel gauge transmitter or the fuel delivery unit from a full or partly filled fuel tank, pay attention to the following points:

- The extraction hose of an exhaust extraction system which is switched on, must be positioned close to the assembly opening of the fuel tank in order to extract the released fuel vapours, even before the work is commenced. If no exhaust extraction system is available, a radial fan (motor not in air flow of fan) with a delivery volume of more than 15 m^3/h must be used.
- Prevent skin contact with fuel! Wear fuel-resistant gloves!

Note the following if testers and measuring instruments have to be used during a road test:

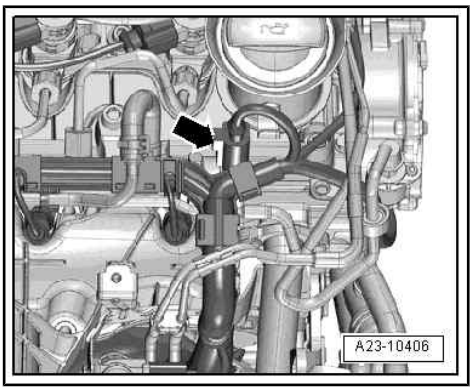
- Always secure the test and measuring devices on the rear seat and have a second person operate them there.

If the test and measuring devices are operated from the passenger seat, the passenger could be injured by the release of the passenger airbag in the event of an accident.

WARNING

Secure the diagnostic device to the rear seat and operate from that position.

Observe the following points to prevent injury to persons and/or damage to the injection and preheating system:



- People, who have a heart pacemaker implant, should not bend over the engine compartment when the engine is running, as the injection units (electromagnetic or piezo electric injectors) generate an output high voltage pulse.
- No fuel lines must be opened when the engine is running.
- Disconnect and connect wires of the preheating and injection system as well as measuring device wires when the ignition is switched off.
- Do not carry out engine wash unless the ignition is switched off.
- If the engine must be operated, without it starting, unplug the connector -arrow- at the fuel pressure regulating valve - N276- .
- Switch off the ignition before disconnecting and connecting the battery, as this may damage the engine control unit.
- After connecting the battery, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

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3 Repair instructions

⇒ “3.1 Self-diagnosis”, page 6

⇒ “3.2 Supplementary instructions and assembly work on vehicles with an air conditioning system”, page 6

⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6

⇒ “3.4 Regulations concerning cleanliness when working on the exhaust gas turbocharger”, page 7

⇒ “3.5 General instructions for charge air system”, page 7

⇒ “3.6 Removing and replacing the fuel hoses in the engine compartment”, page 9

3.1 Self-diagnosis

This Rep.-Gr. is deleted.

For this use the “Vehicle self-diagnosis”, “Measuring method” and “Fault finding” ⇒ Vehicle diagnostic tester.

3.2 Supplementary instructions and assembly work on vehicles with an air conditioning system

WARNING

Do not open the refrigerant circuit of the air conditioning system.

Note

To prevent damage to condenser or to refrigerant lines/hoses, ensure that the lines and hoses are not stretched, kinked or bent.

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Steps which should be taken in order to remove and install the engine without opening the refrigerant circuit:

– Unscrew the retaining clip(s) on the refrigerant lines.
– Remove V-ribbed belt ⇒ “1.1 Assembly overview - V-ribbed belt drive”, page 38 .
– Remove AC compressor from the bracket for auxiliary units ⇒ “1.1 Assembly overview - V-ribbed belt drive”, page 38 .
– Mount the air conditioning compressor and the condenser in such a way that the refrigerant lines/hoses are not under tension.

3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system

Carefully observe the following “rules” for cleanliness when working on the fuel supply/injection system:

♦ Thoroughly clean the connection points and their surroundings before releasing.
♦ Place removed parts on a clean surface and cover. Use lint-free cloths!

- Carefully cover or close open components if the repair is not completed immediately.
- Only install clean parts: remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped (e.g. on a shelf or in a tool box).
- When the system is opened: Avoid using compressed air. Avoid moving the vehicle.
- Also make sure no diesel fuel runs onto the coolant hoses. If this is the case clean the hoses immediately. Replace immediately any hoses which have suffered damage.

3.4 Regulations concerning cleanliness when working on the exhaust gas turbocharger

Carefully observe the following “rules” for cleanliness when working on the exhaust gas turbocharger:

- Thoroughly clean the connection points and their surroundings before releasing.
- Place removed parts on a clean surface and cover. Use lint-free cloths!
- Carefully cover or close open components if the repair is not completed immediately.
- Only install clean parts: remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped (e.g. on a shelf or in a tool box).
- When the system is opened: Avoid using compressed air. Avoid moving the vehicle.

3.5 General instructions for charge air system

WARNING

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- *Ensure that there is adequate free access to all moving or hot components.*

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Caution

In case a mechanical damage to the exhaust gas turbocharger is found, e.g. damage to the compressor wheel, it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, perform the following tasks:

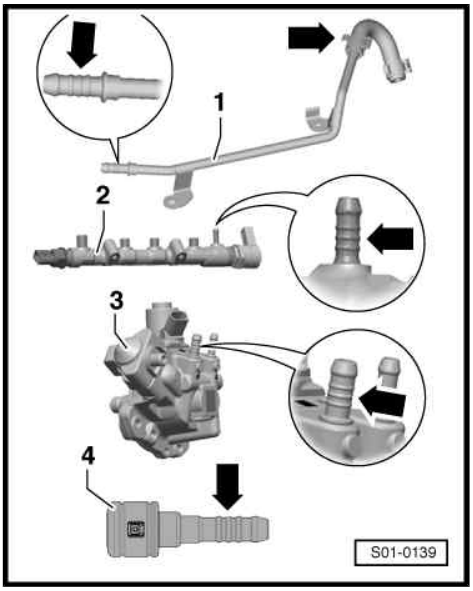
- *Clean all oil lines.*
- *Change engine oil and oil filter.*
- *Check air filter, air filter insert and charge air hoses as well as charge air pipes for soiling.*
- *Check all the air guides and the charge air cooler for foreign bodies.*

If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.

- The charge-air system must be tight, check ⇒ “2.6 Checking the charge-air system for leak-tightness”, page 259 .
- Replace the gaskets, the sealing rings and the self-locking nuts.
- Hose connections and hoses for the charge air system must be free of oil and grease before being installed.
- Observe markings on the hoses and components.
- All hose connections of the charging system are secured with screw clamps.
- Only install approved clamps for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .
- Observe the instructions for installing the charge air hoses and tightening torques of the screw clamps ⇒ “2.3 Hose connections with screw clamps”, page 257 .
- Before screwing down the oil feed line, fill the exhaust turbocharger via the connection fitting with engine oil.
- After installing the exhaust turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger bearing.

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3.6 Removing and replacing the fuel hoses in the engine compartment



Note

- *On this engine, the nozzles -arrows- for the pressurized fuel hoses have a so-called 3-wave profile. In this way, the tightness of the fuel system is improved.*
- *When removing the fuel hoses, in most cases the very thin barrier layer on the inside of the fuel hose is damaged.*
- *This damage is not visible to the eye. However, it can lead to leakage of the fuel system after a certain period of time.*
- *When the fuel hoses are refitted on the nozzles, the initial position of the hose on the 3 waves cannot be ensured. This encourages the tendency to leak.*

Caution

- ***After removing the fuel hoses from nozzles with 3-wave profile, replace these fuel hoses.***

-Arrows-	3-wave profile
-1-	Return-flow line
-2-	Return line support at fuel distributor
-3-	Delivery nozzle of the high pressure pump
-4-	Quick coupling on the fuel filter

Note

- *For the above mentioned reasons, always disconnect the quick coupling when removing the fuel hoses from the fuel filter.*
- *Do not open the spring-type clip and detach the fuel hose from the connector of the quick coupling.*
- *If only other parts are removed: check whether it is possible to separate the fuel system at the quick couplings at the fuel filter or at the connection points in the right of the engine compartment.*

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If a fuel hose cannot be disconnected from the hose nozzle by hand:

Caution

Never push a screwdriver or a similar tool between the hose and the hose nozzle!

- ***Risk of damage to the nozzle - the component must would have to be replaced.***

– Turn the fuel hose with suitable pliers and detach the hose.

If a fuel hose can still not be disconnected from the hose nozzle:

– Only cut into the textile layer of the hose lengthwise and detach the hose.

• Do not cut through the inner rubber layer. If the nozzle is damaged, it is necessary to replace the complete component.

Note

- *Before fitting the new fuel hose, thoroughly clean the hose nozzle from grease, oil and dirt. To do so, do not use any metal tools which could damage the hose nozzle.*
- *Fit the fuel hose on the nozzle without lubricant and secure with spring strap clamp.*

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10 – Removing and installing engine

1 Removing and installing engine

⇒ “1.1 Removing and installing engine trim panel”, page 11

⇒ “1.2 Removing engine”, page 12

⇒ “1.3 Securing the engine to the assembly stand”, page 21

⇒ “1.4 Installing engine”, page 21

⇒ “1.5 Assembly overview - assembly mountings”, page 26

⇒ “1.6 Checking and adjusting the assembly bracket”, page 28

⇒ “1.7 Removing and installing engine support”, page 33

1.1 Removing and installing engine trim panel

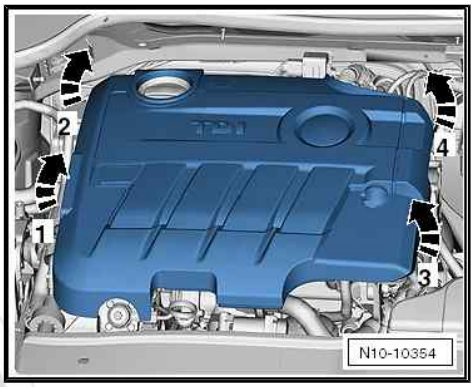
Removing

Caution

The brackets of the engine cover on the cylinder head cover can break off when they are incorrectly removed.

- *It is therefore necessary to remove the engine cover according to the following instruction.*

– Successively slacken the engine cover in the marked sequence -1 ... 4- from the fixing points. To do so, grip the engine cover from underneath as far as possible in the area of the -arrows- and pull it upwards out of the attachment.



Installing

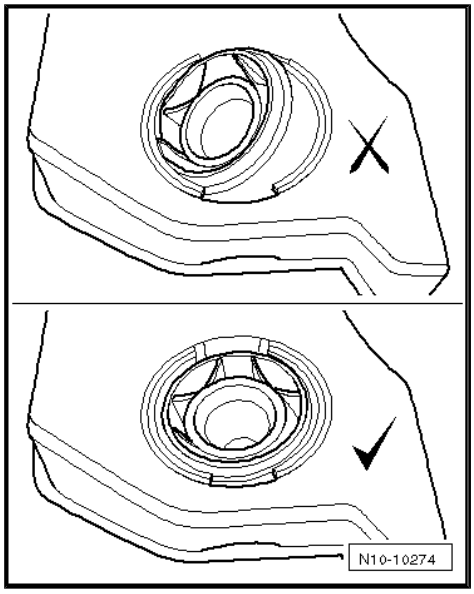
Caution

Before installing the engine cover, check the correct fitting position of the 4 fixing elements (ball sockets), if necessary move them into the correct position. Otherwise this can lead to damage to the engine cover.

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– If necessary, adjust the ball sockets of the engine cover to the correct position.
– Position the engine cover onto the fixing points and press it in at the corners until it clicks into place.



1.2 Removing engine

Special tools and workshop equipment required

- Removal tool for inner lining of the door panel - MP8-602/1-
- Engine mount - T10012-
- Engine/gearbox jack , e.g. -V.A.G 1383 A-
- Catch pan , e.g. -VAS 6208-
- Double ladder , e.g. -VAS 5085-
- Pliers for spring-type clips

Note

- *If the stripped engine is replaced after engine removal, the tightening of the injection unit clamping claws on the new stripped engine must be checked. Tightening torque: Pos. -7- ⇒ "2.2 Summary of components - injection units", page 270 .*
- *The engine is removed downwards together with the gearbox.*
- *All cable straps that have been loosened or cut open when the engine was removed must be attached again in the same location when the engine is installed again.*
- *Leave the ignition key in the ignition lock so that the steering lock does not click into place.*
- *Collect and dispose of drained coolant in a clean container.*
- *Observe the disposal instructions.*

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Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- ***Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.***
- ***Ensure that there is adequate free access to all moving or hot components.***

Observe all safety measures and notes for assembly work on the fuel supply and injection system, at the charge air system and also observe the rules for cleanliness
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 ,
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– If present, take the adapter for the anti-theft wheel bolts out of the luggage compartment.

– Disconnect the battery-earth strap with the ignition off ⇒ Electrical System; Rep. gr. 27 .

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Remove air filter, air mass meter - G70- and intake hose
⇒ “3.6 Removing and installing air filter”, page 309 .

– Remove the battery with the battery tray ⇒ Electrical System; Rep. gr. 27 .

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Engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

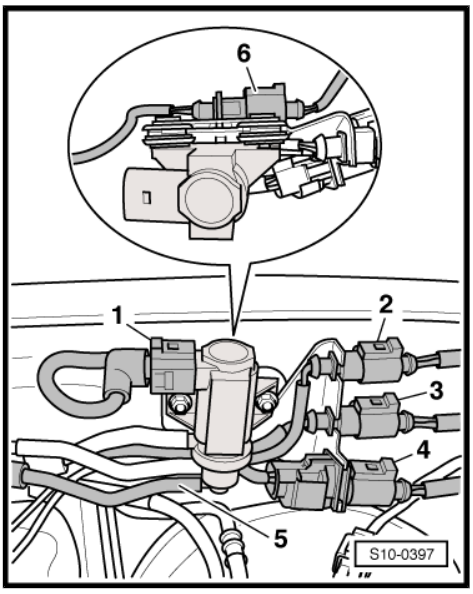
– Unplug the following plug connections at the bulkhead:

2 - Exhaust gas temperature sender 4 - G648- (orange)

3 - Exhaust gas temperature sender 1 - G235- (Temperature sender upstream turbocharger - G507-) (black)

4 - Lambda probe - G39- (black)

6 - Exhaust gas temperature sender 3 - G495- (brown)

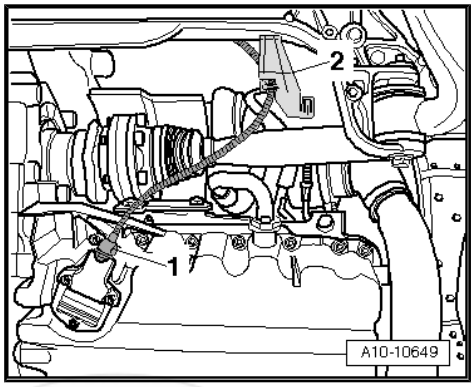


Continue for all engines

– Pull off the vacuum hose -5- from the charge pressure control solenoid valve - N75- .

– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

– Disconnect electrical plug connection -1- at the oil level and oil temperature sender - G266- .
– Remove bracket -2- for the wiring harness of the oil level and oil temperature sender - G266- from the assembly carrier.

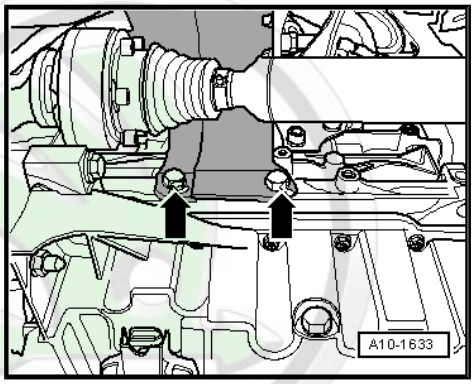


Vehicles with front-wheel drive

– If present, unscrew heat shield for right drive shaft -arrows-.

Continued for all vehicles

– Remove the right and left wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
– Remove the drive shafts ⇒ gearbox; Rep. gr. 40 .
– Remove pre-exhaust pipe:



♦ Engine identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA
⇒ “1.5 Removing and installing pre-exhaust pipe with particle filter”, page 327

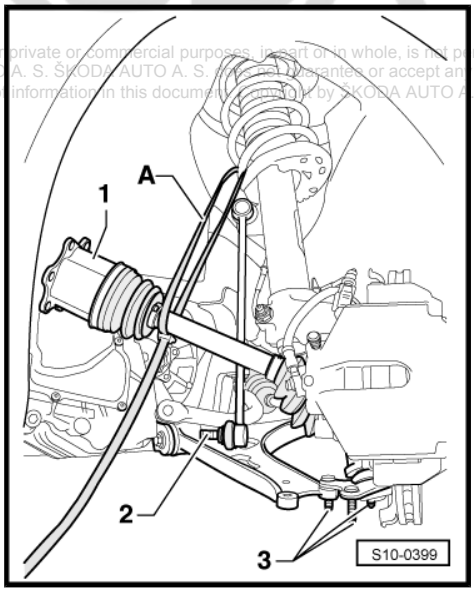
♦ Engine identification characters CLCA, CLCB, CLJA
⇒ “1.6 Removing and installing pre-exhaust pipe with catalytic converter”, page 331

Vehicles with four-wheel drive

– Unscrew propshaft from angle gearbox ⇒ Gearbox; Rep. gr. 39 .

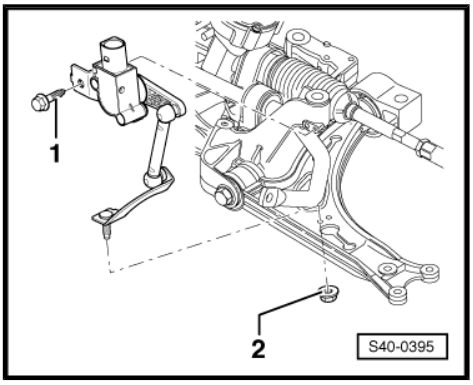
Continued for all vehicles

– Unscrew the nut from the left coupling rod -2- and press off the coupling rod from the anti-roll bar.
– Unscrew the nuts from the left steering joint -3- and press the steering joint out of the suspension arm.
– Unscrew the nut -2- from the left track control arm if the front left vehicle level sensor - G78- is present.

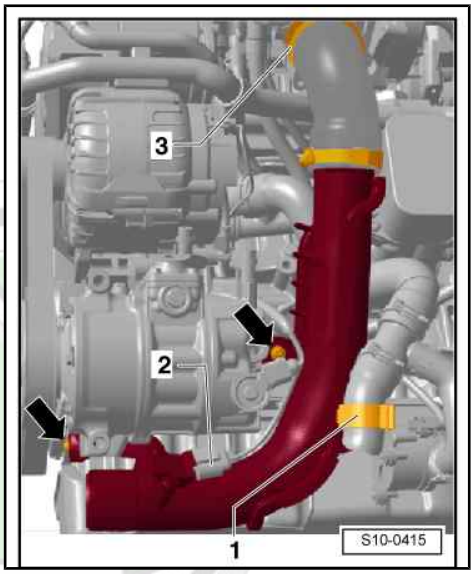


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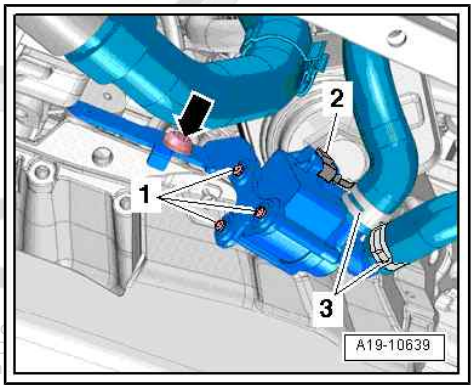
– If present, remove the nut -2- for front left vehicle level sensor - G78- from left track control arm.
– Turn the steering to full left lock.
– Swivel the steering joint outwards and secure the drive shaft -1- with a band -A- in the wheelhouse. The assembly carrier is already removed.
– Insert a pin screw in the suspension arm in order to stabilize the steering joint.
– Remove radiator
⇒ “3.4 Removing and installing radiator”, page 177 .



– Remove screws -arrows-.
– Detach coolant hose -1-.
– Loosen hose clamp -3-.
– Disconnect the plug -2- at the charge pressure sender - G31- with intake air temperature sender - G42- and remove the right charge air pipe.

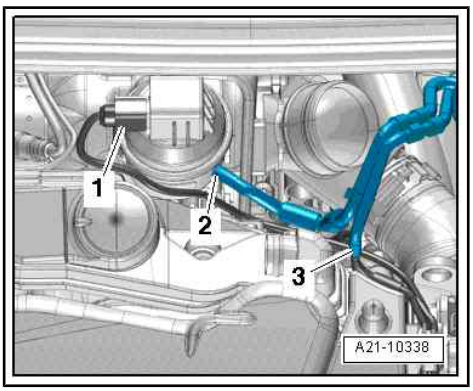


– Unscrew screw -arrow- and push the coolant recirculation pump 2 - V178- to the side.

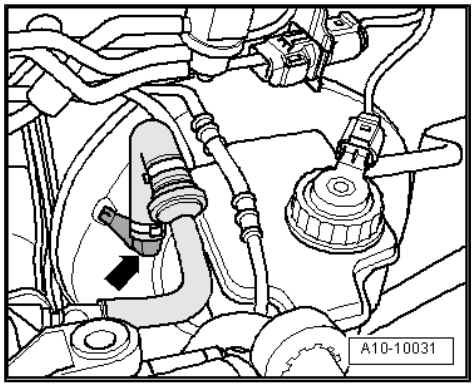


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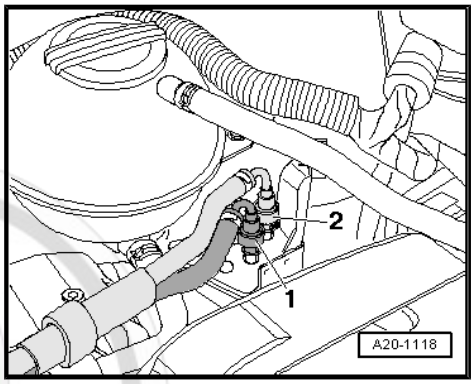
– Remove vacuum hose -2- from vacuum setting element of exhaust turbocharger.
– Disconnect vacuum hose -3-.



– Remove the vacuum hose -arrow- from the brake servo unit.

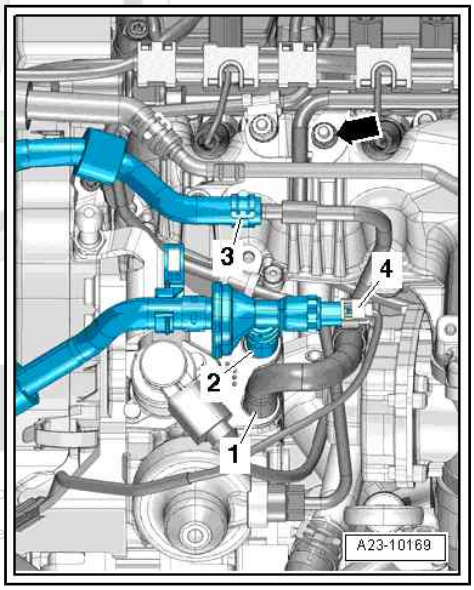


– Separate fuel feed line -2- and fuel return-flow line -1-, to do so press in securing rings. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .



– Disconnect the plug connection -4- at the differential pressure transmitter - G81- .

– Remove fuel feed line as well as fuel return-flow line, to do so loosen hose clamps -2- and -3-.



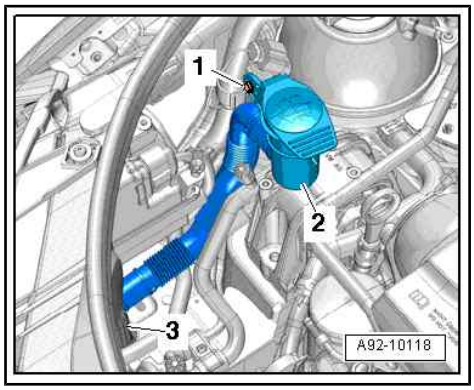
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– Unscrew bolt -1-.

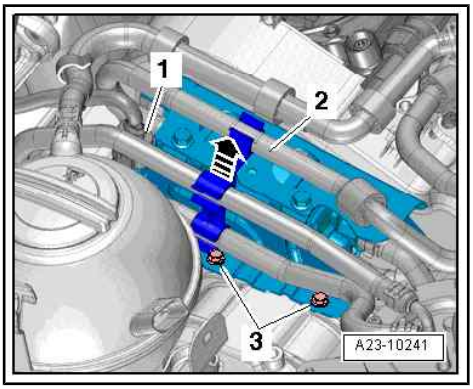
– Push the filler tube with the filler neck -2- for the washer-fluid reservoir to the side.

Note

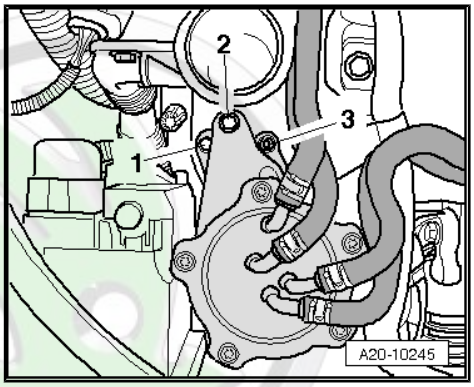
For reasons of clarity the fuel filter is not shown.



– Unhook the fuel hose -2- from the bracket.
– Remove the bracket for the fuel lines upwards in -direction of arrow- and place it to the side.
– Disconnect the plug -1- from the additional fuel pump - V393- or from the fuel pump 2 - V277- .
– Unscrew screws -3-.



– Loosen screw -1- by 2 turns.
– Release screw -2- and nut -3-.
– Unclip bracket for coolant line at fuel filter.
– Remove the fuel filter with the hoses connected and the bracket with the additional fuel pump - V393- or with the fuel pump 2 - V277- .



Vehicles with air conditioning

– Remove V-ribbed belt
⇒ “1.4 Removing and installing V-ribbed belt for vehicles with air conditioning system”, page 46 .

WARNING

Risk of injury through refrigerant.

- *Do not open the refrigerant circuit of the air conditioning system.*

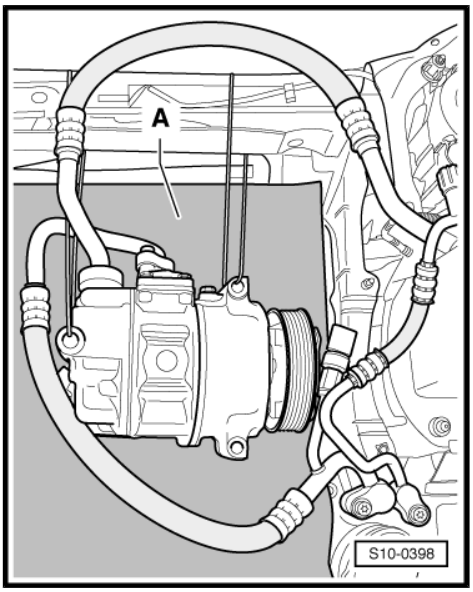
Note

In order to avoid damage to the AC compressor as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.

– Remove the AC compressor from the bracket for auxiliary units, to protect the charge air cooler place cardboard -A- on it and secure the AC compressor with connected refrigerant hoses to the lock carrier.

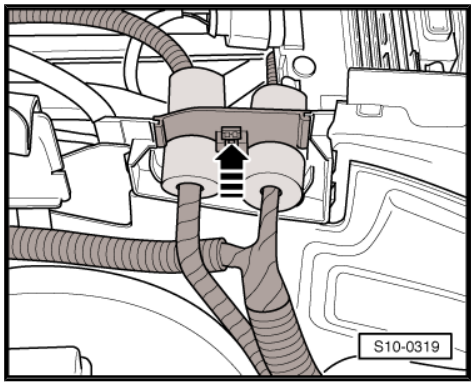
Continued for all vehicles

– Unlatch the fuse and disconnect the front plug from the engine control unit
⇒ “4.1 Removing and installing engine control unit”, page 312 .

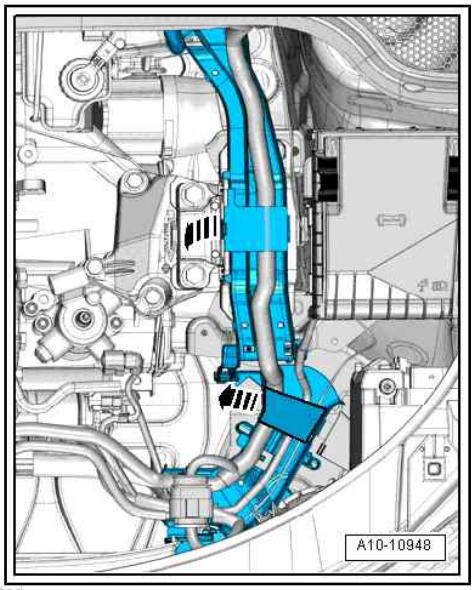


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– Release duct for engine wiring harness -arrow- and pull out upwards.

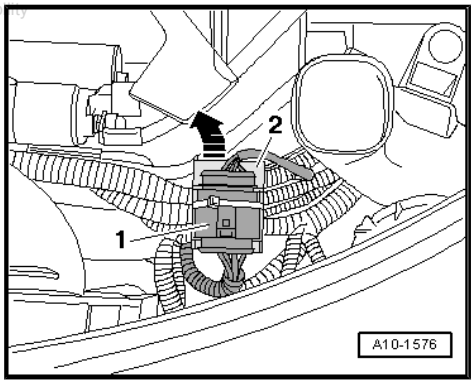


– Open the cable guides -arrows-, remove the engine wiring harness and place down to the side.



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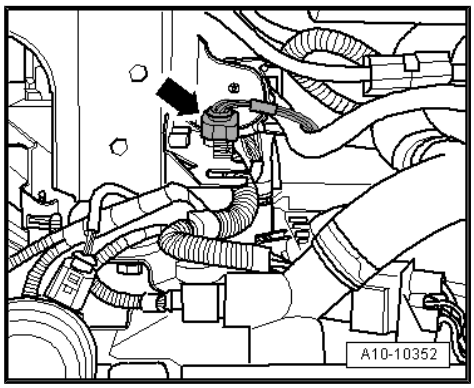
– Expose the plug connection -1- and disconnect it.
– Open the bracket -2- lying below the cable guide.
– Remove the wiring loom to the engine control unit from the cable guide using the removal tool - MP8-602/1- and lay it on the engine.



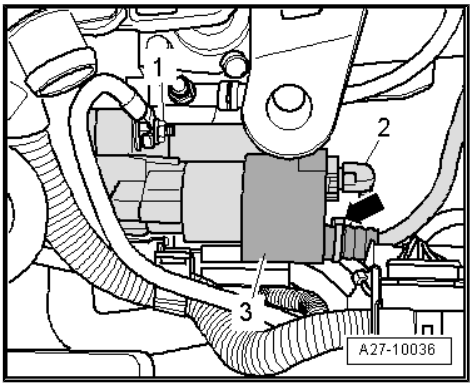
– Disconnect plug connection -arrow- at the bottom left frame side rail.

Note

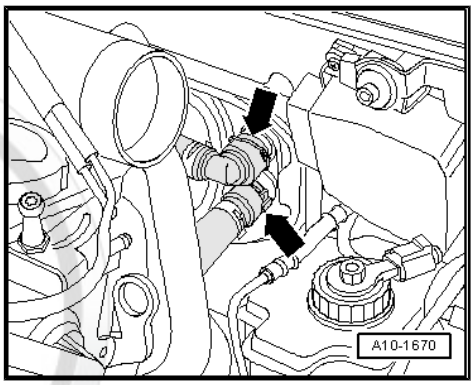
For purposes of presentation, the fitting position is shown from below.



– Remove the cable strap of the -arrow- protective cover, if present.
– Unbolt earth cable -1-.
– Disconnect plug connection -2-.
– Pull back the protective collar and unscrew the B+ cable from the bracket of the solenoid switch for the starter.
– Disconnect further necessary plug connections at the engine and gearbox or line connections to engine and gearbox.



– Separate the quick couplings -arrows- at the heat exchanger.
– Pull off coolant hose at the top and bottom of the coolant expansion reservoir.



Vehicles with auxiliary heating

– Place a catch pan for coolant under the auxiliary heating.
– Detach the coolant hoses of the auxiliary heating.

Vehicles fitted with a manual gearbox

– Remove shift mechanism from gearbox ⇒ Gearbox; Rep. gr. 34 .
– Remove pressure line from breather/slave cylinder ⇒ Gearbox; Rep. gr. 30 .

WARNING

After separating the hydraulic line, do not operate the clutch pedal.

Vehicles with automatic gearbox

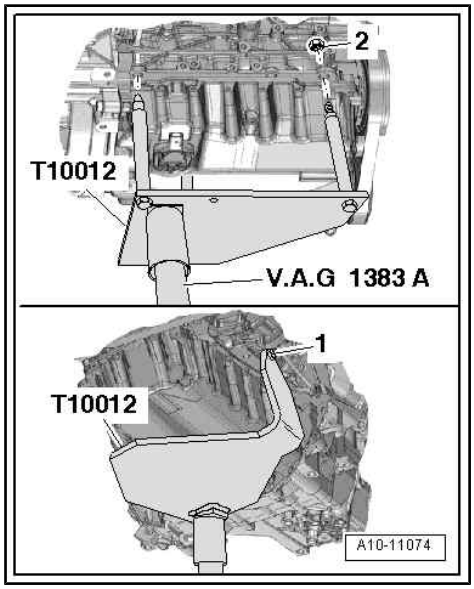
– Remove shift mechanism from gearbox ⇒ Automatic Gearbox; Rep. gr. 34 .

Continued for all vehicles

– Unclamp all remaining connecting, coolant, vacuum and suction hoses from the engine.
– Release all remaining plugs at engine and gearbox and lay aside the relevant lines.

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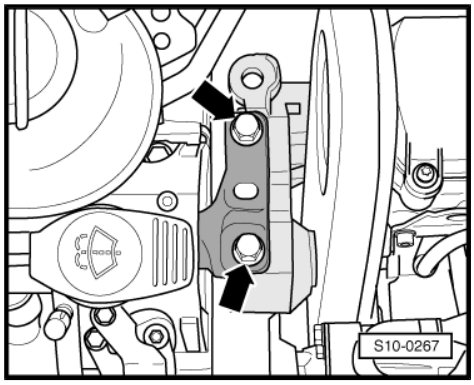
– Screw engine mount - T10012- to the cylinder block with nut -2- and screw -1- to 20 Nm.
– Insert engine/gearbox jack - V.A.G 1383 A- in the engine mount and slightly raise.



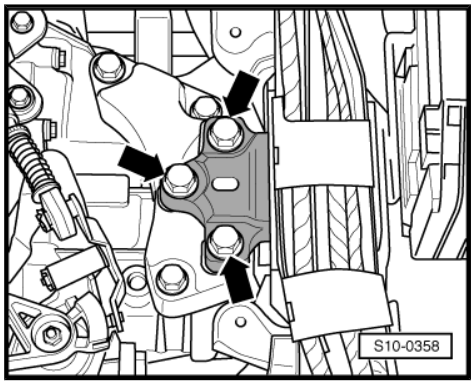
Note

Use double ladder to release the screws for the engine/gearbox mounting.

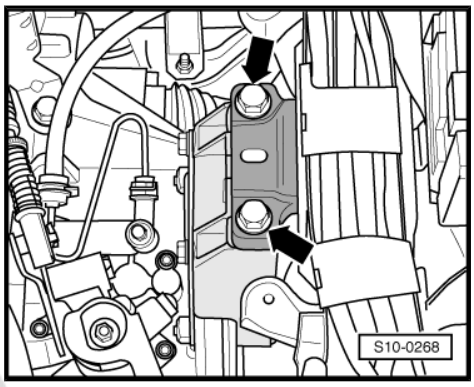
– Successively release screws for engine mounting -arrows-.



– Successively unscrew screws for gearbox mount -arrows- at gearbox 02E or ...



– or at gearbox 0A4 -arrows-.



Note

- *Check whether all hose and line connections between engine, gearbox and body are released.*
- *When lowering carefully guide the engine with the gearbox, in order to avoid damage.*

– Carefully lower engine with gearbox. During this procedure, turn or move the engine with the gearbox depending upon the constriction.
– Remove the gearbox from the engine.

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1.3 Securing the engine to the assembly stand

Note

The assembly stands - MP9-101- can be used with engine mount - MP1-202- or the assembly stands - VAS 6095- for fastening.

Special tools and workshop equipment required

- Workshop crane , e.g. -VAS 6100-
- Engine and gearbox mount - VAS 6095-
- Lifting device - MP 9-201 (2024A)-

Condition

- Separate engine from gearbox.

Securing the engine to the assembly stands - MP9-101-

WARNING

Use securing pins on the hooks and rig pins to prevent release.

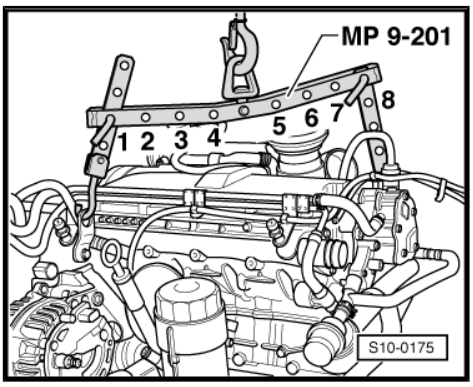
– Attach lifting device - MP 9-201 (2024A)- to engine and to workshop crane , e.g. -VAS 6100- .

Belt pulley end

- 2nd hole of the extension in Position 1

Flywheel side

- 4th hole of the extension in Position 8



Note

The illustration shows a pump injector engine. The attachment for the Common Rail engine occurs in the same way.

– Lower engine from engine mount -VAS 6100- using workshop crane - T10497- or -T10497A- .

– Attach engine attached to engine and gearbox mount - VAS 6095- .

1.4 Installing engine

Special tools and workshop equipment required

- Grease - G 000 100- for manual gearbox
- High temperature grease - G 052 133 A2- for automatic gearbox

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Condition

- Engine with installed engine mount - T10012- on engine and gearbox jack, e.g. - V.A.G 1383 A- .

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Observe all safety measures and notes for assembly work on the fuel supply and injection system, at the charge air system and also observe the rules for cleanliness*
  ⇒ "2.1 Safety precautions when working on fuel supply system", page 4 ,
  ⇒ "3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6 .
- *When undertaking assembly replace self-locking nuts and screws which have been tightened to a torquing angle.*
- *Always replace gasket rings and seals.*
- *All cable straps should be fastened again in the same place when installing.*
- *Secure all hose connections with corresponding hose clamps ⇒ ETKA - Electronic Catalogue of Original Parts .*

Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- ***Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.***
- ***To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.***

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Vehicles fitted with a manual gearbox

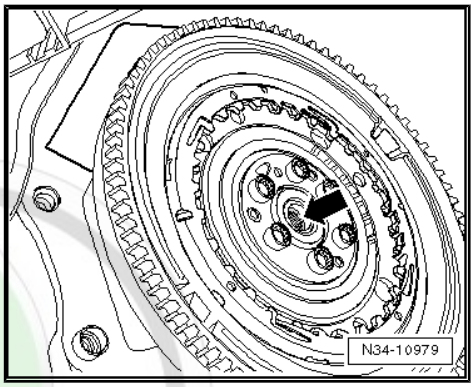
Note

- *Clean the drive shaft serration and hub serration on a used clutch disc, remove corrosion and only apply a very thin layer of grease - G 000 100- on the serration. Then move clutch plate to and fro on input shaft until hub moves freely on shaft. Always remove excess grease.*
- *After installing the coupling, check the centering of the clutch disc ⇒ Gearbox; Rep. gr. 30 .*
- *Check the clutch release bearing for wear. Replace release bearing if worn ⇒ Gearbox; Rep. gr. 30 .*

Vehicles with automatic gearbox

Note

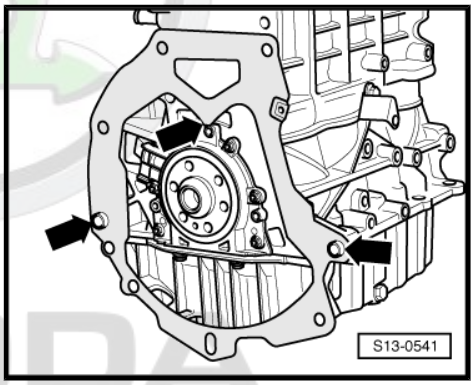
- *Check needle bearing for drive shaft pin in the crankshaft. Replace bearing if worn*
  ⇒ "3.4 Replace needle bearing for crankshaft", page 83 .
- *Lubricate needle bearing and drive shaft pin with a thin layer of high temperature grease - G 052 133 A2- . Do not grease the serration of the drive shaft.*



Continued for all vehicles

– Check whether the dowel sleeves for centring the engine/ gearbox are present in the cylinder block; insert if necessary.

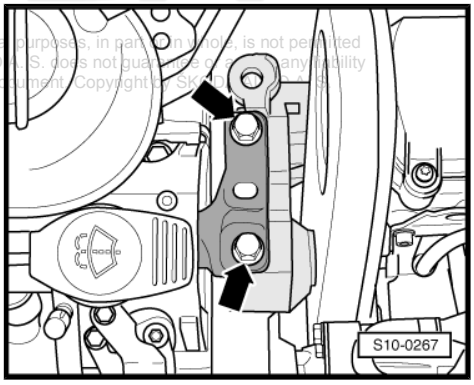
Ensure that the intermediate plate has been inserted on the sealing flange and is pushed onto the dowel sleeves -arrows-.



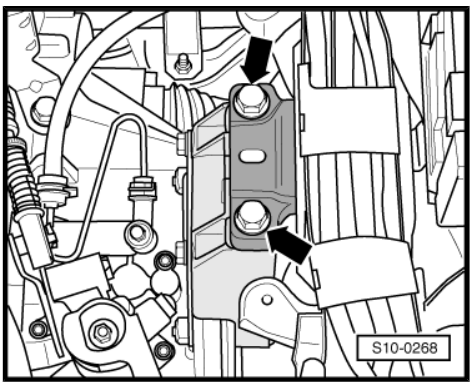
– Screw on gearbox to engine ⇒ Gearbox; Rep. gr. 34 .
– Insert engine with gearbox into the body.

– Successively screw in by hand the screws for engine mounting -arrows-.

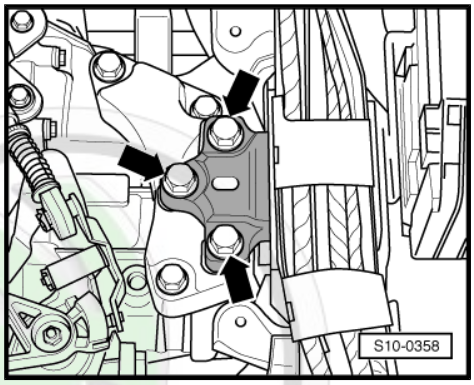
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– Successively screw in screws for gearbox mount -arrows- at gearbox 0A4 or ...



at gearbox 02E -arrows- by hand.



Vehicles with four-wheel drive

– Install propshaft ⇒ Gearbox; Rep. gr. 39 .

Continued for all vehicles

– Align engine and gearbox mount and tighten screws ⇒ “1.6 Checking and adjusting the assembly bracket”, page 28 .

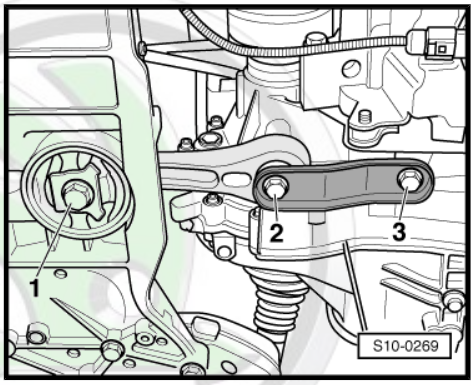
– Remove engine mount - T10012- from engine.

– Install pre-exhaust pipe:

♦ Engine identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA ⇒ “1.5 Removing and installing pre-exhaust pipe with particle filter”, page 327

♦ Engine identification characters CLCA, CLCB, CLJA ⇒ “1.6 Removing and installing pre-exhaust pipe with catalytic converter”, page 331

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– First screw on pendulum support with new screws -2- and -3- at gearbox and then screw on with new screw -1- at assembly carrier.

– Install the left as well as the right drive shaft ⇒ Chassis; Rep. gr. 40 .

Vehicles fitted with a manual gearbox

– Connect hydraulic line to breather/clutch slave cylinder and bleed the clutch hydraulic ⇒ Gearbox; Rep. gr. 34 .

– Attach the shift mechanism to the gearbox and adjust ⇒ Gearbox; Rep. gr. 34 .

Vehicles with automatic gearbox

– Attach the shift mechanism to the gearbox ⇒ Automatic Gearbox; Rep. gr. 34 .

Continued for all vehicles

– Install AC compressor at the bracket for auxiliary units ⇒ “1.1 Assembly overview - V-ribbed belt drive”, page 38 .

– Install the V-ribbed belt ⇒ “1.1 Assembly overview - V-ribbed belt drive”, page 38 .

– Install radiator ⇒ “3.4 Removing and installing radiator”, page 177 .

– Install fan shroud with fan ⇒ “3 Radiator and radiator fan”, page 172 , to do so ensure adequate clearance of the fan motors.

– Connect all connecting, fuel, cooling fluid, vacuum and suction hoses to the engine.

– Connect electrical connections and attach cables ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

– Carry out cohesive work when reconnecting the battery ⇒ Electrical System; Rep. gr. 27 .

Vehicles Octavia II

– Install bulkhead plenum chamber and plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

Superb II vehicles

– Install the plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

Yeti vehicles

– Install bulkhead plenum chamber and plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

Continued for all vehicles

– Install windscreen wiper arms ⇒ Electrical System; Rep. gr. 92 .

– Top up coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

– Filling and bleeding the fuel system. For this purpose, connect the vehicle diagnosis, measurement and information system - VAS- and carry out the targeted function “bleeding the fuel system”. During this function, the fuel pump is actuated for 180 seconds.

– Check fuel system for tightness ⇒ “2.4 Check the fuel system for tightness”, page 276 .

– Checking the oil level:

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- ⇒ Maintenance ; Booklet Octavia II
- ⇒ Maintenance ; Booklet Superb II
- ⇒ Maintenance ; Booklet Yeti

– Install the noise insulation ⇒ Body Work; Rep. gr. 50 .

Vehicles Octavia II

– Install the bottom part of the right and left wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

Vehicles Superb II and Yeti

– Install the right as well as the left wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

Continued for all vehicles

– Perform a test drive

– Query the fault memory of the engine control unit, rectify any faults and delete the fault memory ⇒ Vehicle diagnostic tester.

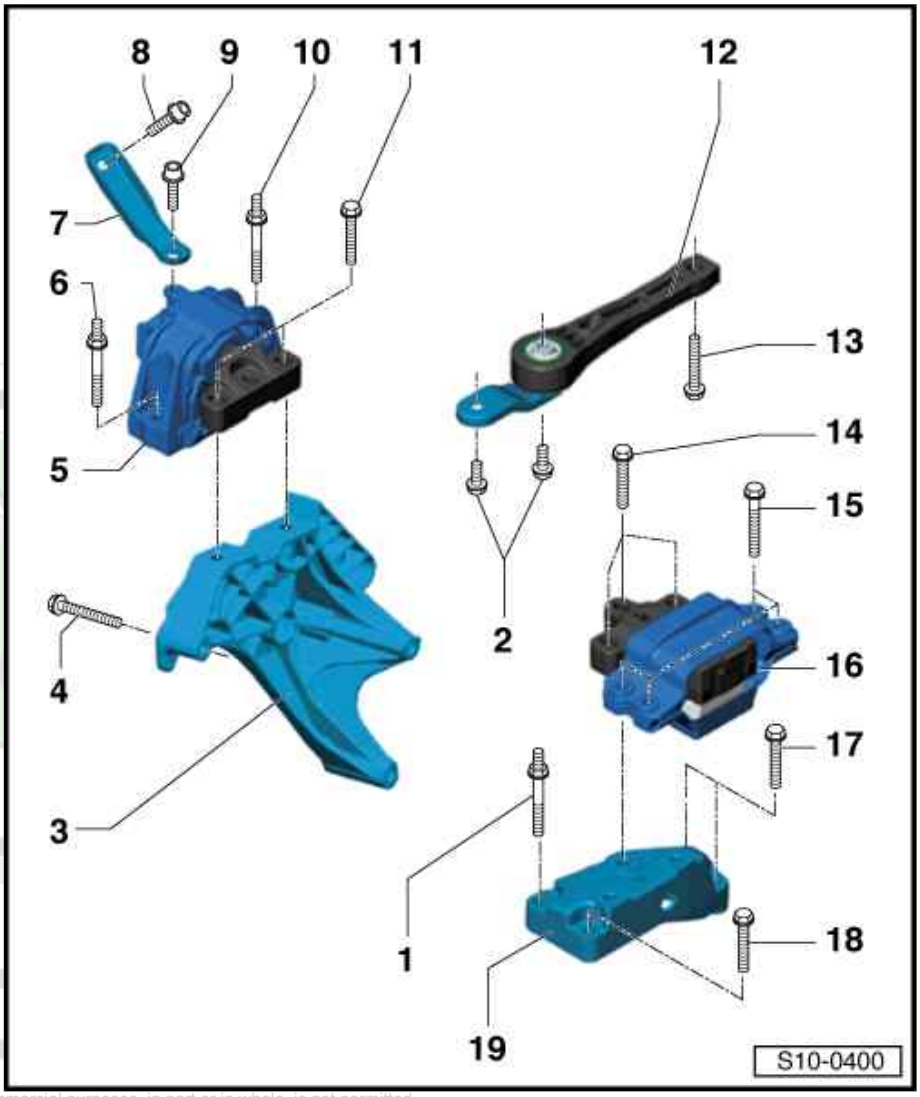
Tightening torques - summaries of components

Component		Nm
Screws or nuts	M6	8 (9)[1)]
	M7	13 (13)[1)]
	M8	20 (20)[1)]
	M10	40 (40)[1)]
	M12	65 (75)[1)]
Engine/gearbox connecting screws ⇒ gearbox; Rep. gr. 34 screws for assembly bracket ⇒ “1.5 Assembly overview - assembly mountings”, page 26		

[1)] The instruction in the brackets applies to collar screws and collar nuts.

1.5 Assembly overview - assembly mountings

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1 - Screw

- ❑ Tightening torque ⇒ Gearbox; Rep. gr. 34

2 - Screw

- ❑ Replace after disassembly
- ❑ on manual gearbox MQ350 (02Q) check if threaded inserts, e.g. “Heli-Coil”, have been installed in the gearbox housing ⇒ page 28
- ❑ if threaded inserts are not installed, they must be subsequently installed (Part No. 02Q 301 561), otherwise there is the risk of the threads shearing
- ❑ 50 Nm + 90°

3 - Engine support bracket

- ❑ Removing and installing ⇒ “1.7 Removing and installing engine support”, page 33

4 - Screw

- ❑ Replace after disassembly
- ❑ 40 Nm + 180°

5 - Engine mounting

- ❑ Check ⇒ “1.6 Checking and adjusting the assembly bracket”, page 28 .
- ❑ the bracket for the additional fuel pump - V393- or for the fuel pump 2 - V277- is screwed onto the engine mount

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6 - Screw

- ❑ Replace after disassembly
- ❑ 40 Nm + 90°

7 - Connecting piece

8 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 90°

9 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 90°

10 - Screw

- ❑ Replace after disassembly
- ❑ 40 Nm + 90°

11 - Screw

- ❑ Replace after disassembly
- ❑ 60 Nm + 90°

12 - Pendulum support

13 - Screw

- ❑ Replace after disassembly
- ❑ 100 Nm + 90°

14 - Screw

- ❑ Replace after disassembly
- ❑ 60 Nm + 90°

15 - Screw

- ❑ Replace after disassembly
- ❑ 40 Nm + 90°

16 - Gearbox mount

- ❑ Different versions depending on gearbox type ⇒ ETKA - Electronic Catalogue of Original Parts

17 - Screw

- ❑ Tightening torque ⇒ Gearbox; Rep. gr. 34

18 - Screw

- ❑ Tightening torque ⇒ Gearbox; Rep. gr. 34
- ❑ only on gearboxes DQ 250

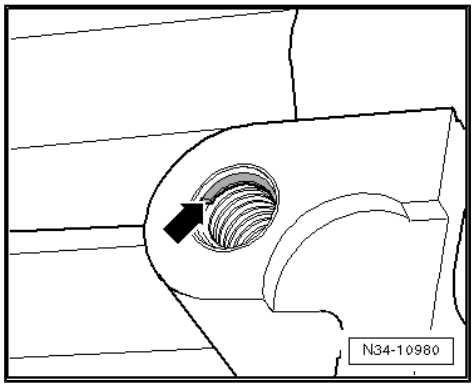
19 - Gearbox support bracket

- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

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Note

- *Remove pendulum support: First remove screw position -13-, then screws position -2-.*
- *Remove pendulum support: First remove screw position -2-, then screws position -13-.*
- *On manual gearbox MQ350 (02Q), only use the screws with the strength category 10.9 if threaded inserts (e.g. Heli Coil) -arrow- have been installed.*



Shoulder at first thread turn -arrow- on installed threaded insert, e.g. “Heli-Coil”

1.6 Checking and adjusting the assembly bracket

⇒ “1.6.1 Checking and adjusting the assembly mounting (Octavia II, Yeti)”, page 28

⇒ “1.6.2 Checking and adjusting the assembly bracket (Superb II)”, page 30

1.6.1 Checking and adjusting the assembly mounting (Octavia II, Yeti)

Special tools and workshop equipment required

- Supporting device - T30099-
- Surface - T30099/1-
- Adapter - MP9-200/3 (10-222A/3)-

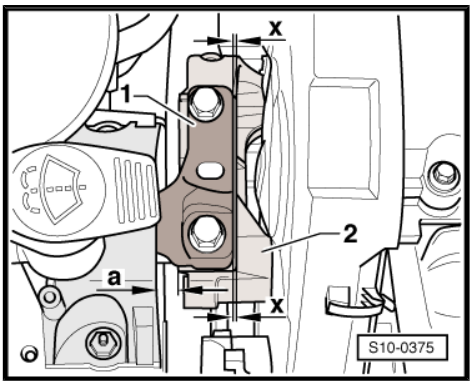
or

- Engine mount - T10012-
- Engine/gearbox jack , e.g. -V.A.G 1383 A-

Check dimensions on the right hanger for engine/gearbox unit:

The following dimensions -a- and -x- must be maintained:

- Between engine bracket and engine support there must be a distance -a- of 10 ... 13 mm.
- The cast iron edge on the engine support -2- must be parallel to the supporting arm -1- the dimension -x- must be the same at the front and rear.



Note

The distance -a- can be checked, for example with suitable round bars.

Only if there is an acoustic complaint (engine or gearbox knock on the frame side rail when cornering) and the dimension -a- is outside 10…13 mm:

– Adjust the assembly bracket ⇒ page 29 .

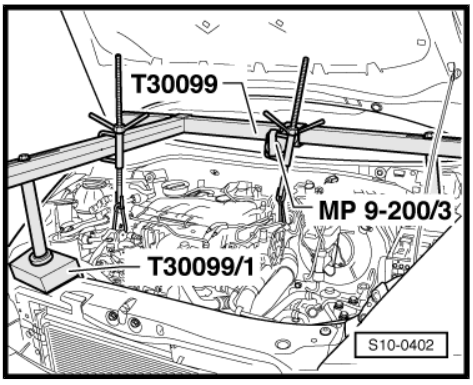
Adjusting the unit mounting

Condition

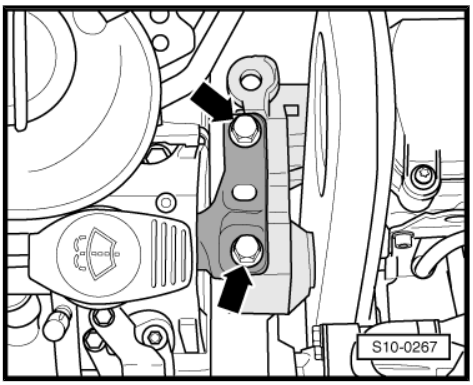
- Engine with gearbox supported with supporting device - T30099- , base - T30099/1- and adapter - MP9-200/3- or engine with gearbox supported with engine mount - T10012- and engine/gearbox jack - V.A.G 1383 A- .

– Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .

– Uniformly pre-tension the engine/gearbox unit with both spindles, but do not raise.

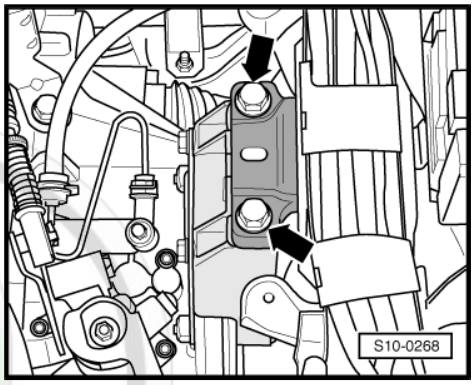


– Slacken screws -arrows- for engine mount by approx. 1 turn.



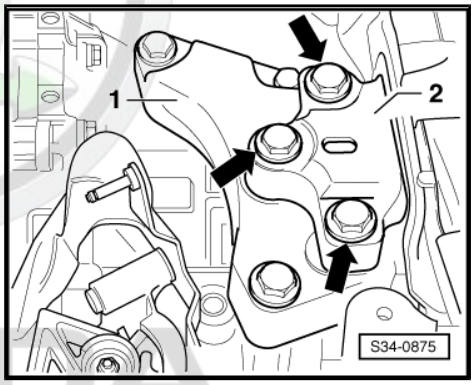
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– Successively unscrew screws for gearbox mount at gearbox 0A4 -arrows- or ...



... at gearbox 02E -arrows- by approx. 1 turn.

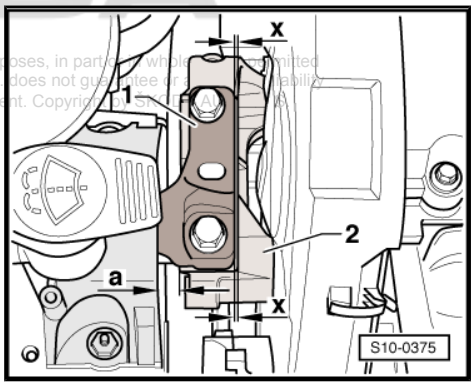
– Successively replace all the screws of the assembly bracket (as long as it has not already been performed when installing) and insert these loosely.



– Move the engine/gearbox assembly with an assembly lever between engine support -2- and supporting arm -1- for engine mount until the following dimensions are set:

The following dimensions -a- and -x- must be maintained:

- Between engine bracket and engine support there must be a distance -a- = 10 mm.
- The cast iron edge on the engine support -2- must be parallel to the supporting arm -1- the dimension -x- must be the same at the front and rear.



Note

The distance -a- = 10 mm can be checked e.g. with suitable round bars.

– Tighten the screws of the assembly bracket.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

◆ Screws for assembly bracket
⇒ “1.5 Assembly overview - assembly mountings”, page 26 .

1.6.2 Checking and adjusting the assembly bracket (Superb II)

Special tools and workshop equipment required

◆ Supporting device - MP9-200 (10-222A)-

- Adapter - MP9-200/3 (10-222A/3)-
- Adapter - MP9-200/18 (10-222A/18)-
- Support - T10311-

or

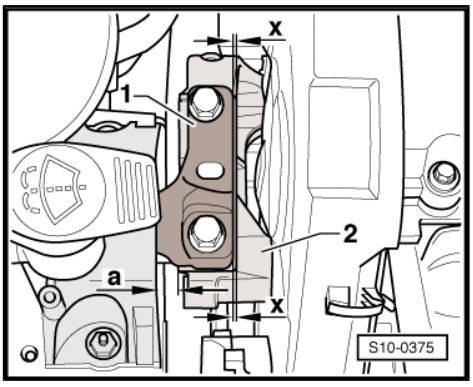
- Engine mount - T10012-
- Engine/gearbox jack , e.g. -V.A.G 1383 A-

Checking the assembly bracket

Check dimensions on the right hanger for engine/gearbox unit:

The following dimensions -a- and -x- must be maintained:

- Between engine bracket and engine support there must be a distance -a- of 10...13 mm.
- The edge on the engine support -2- must be parallel to the supporting arm -1-, the dimension -x- must be the same at the front and rear.



Note

The distance -a- can be checked, for example with suitable round bars.

Only if there is an acoustic complaint (engine or gearbox knock on the frame side rail when cornering) and the dimension -a- is not 10...13 mm:

– Adjust the assembly bracket ⇒ page 31 .

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Adjusting the unit mounting

Condition

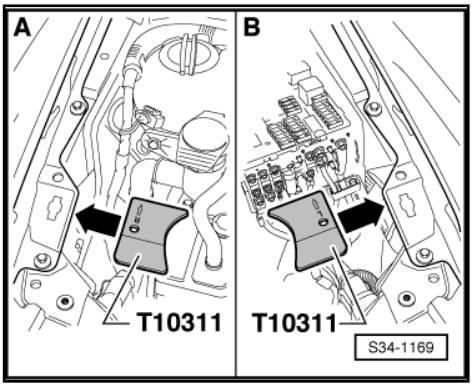
- Engine with gearbox supported with supporting device - MP9-200 (10-222A)- and adapter - MP9-200/3- or engine with gearbox supported with engine mount and engine/gearbox jack .

– Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .

– Remove the front stop buffers for the front flap from both upper edges of the wings at the front.

– Insert the wing plate - T10311- on the right vehicle side -A- in the -direction of the arrow- up to the stop. When doing this, the arrow -R- on the wing plate - T10311- points to the rear.

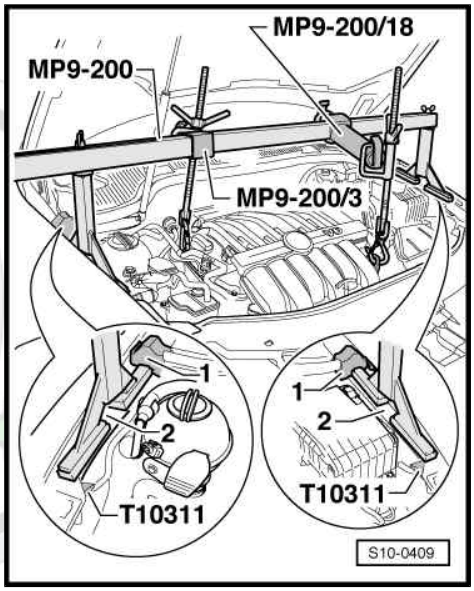
– Also insert the wing plate - T10311- on the left vehicle side -B- in the -direction of the arrow- up to the stop. When doing this, the -arrow L- on the wing plate - T10311- points to the rear.



Note

The wing plates - T10311- ensure that the wings do not get damaged through the weight of the engine/gearbox unit.

– Position the supporting device - MP9-200- with the adapters - MP9-200/3 - and -MP9-200/18- and support the engine/gearbox unit in its installed position.

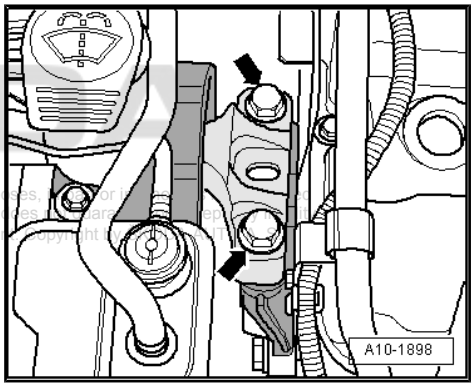


Note

The legs of the supporting device - MP9-200- must be positioned on the edges of the wings -2- and pushed up to the stops -1-.

– Uniformly pre-tension the engine/gearbox unit with both spindles, but do not raise.

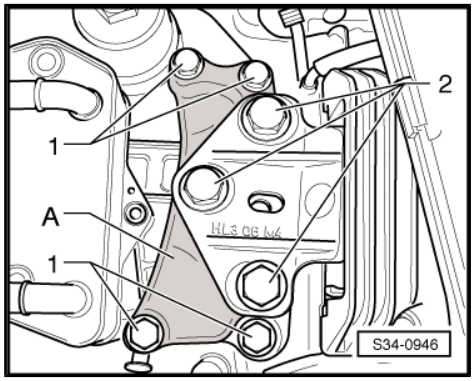
– Slacken screws -arrows- of engine mount by approx. 1 turn.



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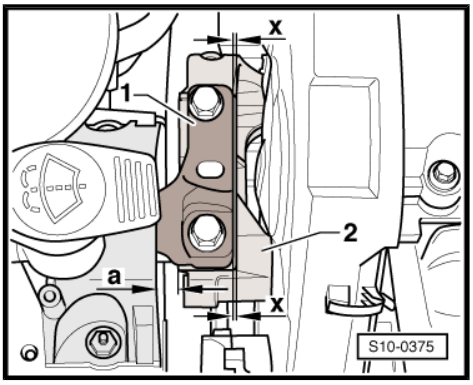
– Loosen screws -2- of gearbox mount by approx. 1 turn.

– Successively replace all the screws of the assembly bracket (as long as it has not already been performed when installing the engine) and insert these loosely.



– Move the engine/gearbox unit with an assembly lever between the engine support -2- and the supporting arm of the engine mount -1- until the following dimensions are set:

- Between engine bracket and engine support there must be a distance -a- = 10 mm.
- The edge on the engine support -2- must be parallel to the supporting arm -1-, the dimension -x- must be the same at the front and rear.



Note

The distance -a- = 10 mm can be checked e.g. with suitable round bars.

– Tighten screws for engine assembly bracket.

Further installation occurs in reverse order.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

♦ Tighten screws for engine assembly bracket
⇒ “1.5 Assembly overview - assembly mountings”, page 26 .

1.7 Removing and installing engine support

Special tools and workshop equipment required

♦ Support bracket - T30099- (Octavia II, Yeti)
♦ Base - T30099/1- (Octavia II, Yeti)
♦ Supporting device - MP9-200 (10-222A)- (Superb II)
♦ Wing plates - T10311- (Superb II)
♦ Adapter - MP9-200/3 (10-222A/3)- (Superb II)
♦ Adapter - MP9-200/18 (10-222A/18)- (Superb II)

Removing

Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- ***Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.***
- ***To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.***

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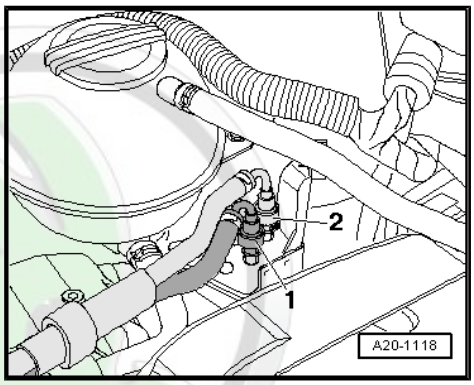
Note

- *Observe the safety instructions*
  ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Observe rules for cleanliness*
  ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Switch off ignition and pull out ignition key.

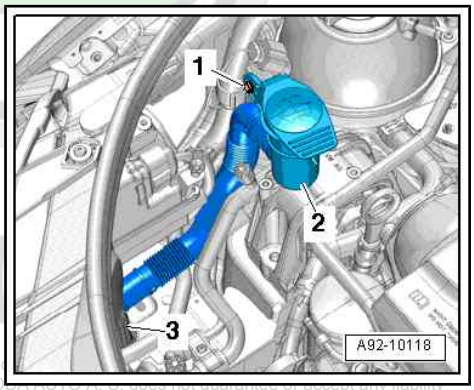
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Separate fuel feed line -2- and fuel return-flow line -1-, to do so press in securing rings. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .



– Unscrew bolt -1-.

– Push the filler tube with the filler neck -2- for the washer-fluid reservoir to the side.



Note

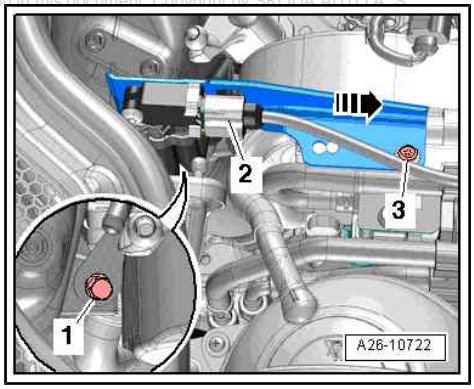
For reasons of clarity the fuel filter is not shown.

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– Disconnect plug -2- at differential pressure indicator - G505- .

– Screw out screw -3- and remove bracket with differential pressure indicator - G505- from the bracket of the additional fuel pump in -direction of arrow-.

– Place the bracket with the differential pressure indicator - G505- to the rear.

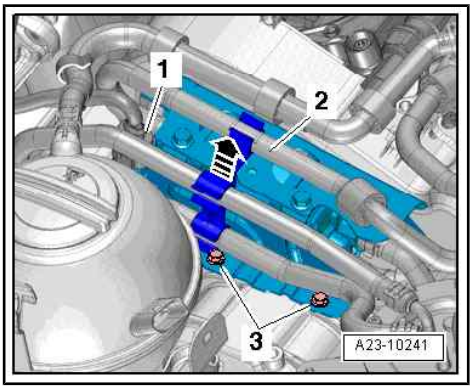


Caution

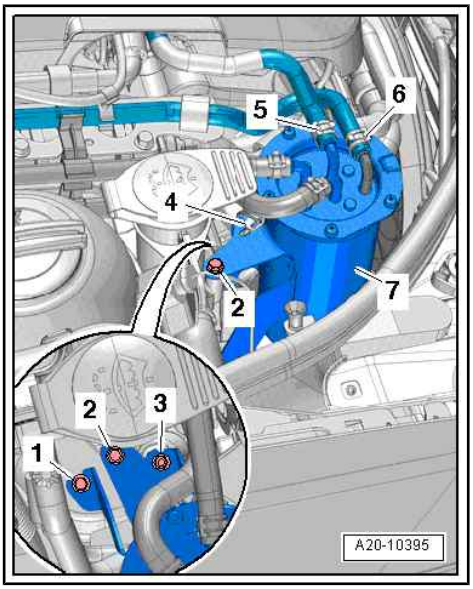
Risk of damage!

- ***The differential pressure indicator - G505- is very sensitive and must not touch any point when it is placed down with the bracket.***

– Unhook the fuel hose -2- from the bracket.
– Remove the bracket for the fuel lines upwards -arrow- and lay to the side.
– Disconnect the plug connection -1- from the additional fuel pump - V393- or from the fuel pump 2 - V277- .
– Unscrew screws -3-.
– Unplug connector from expansion reservoir.
– Unscrew the screws of the expansion reservoir.

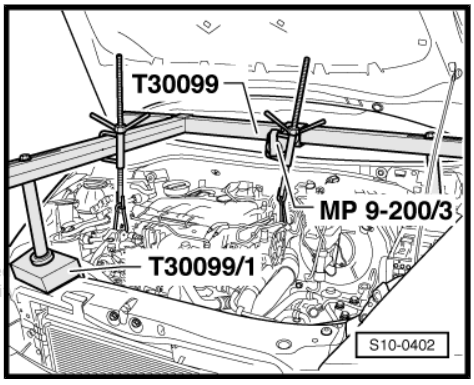


– Release screw -1- by two turns.
– Release screw -2- and nut -3-.
– Unclip bracket for coolant line at fuel filter.
– Lay the expansion tank with the hoses connected, the fuel filter with the hoses connected and the bracket with the additional fuel pump - V393- or additional fuel pump 2 - V277- onto the engine.
– Remove plenum chamber cover ⇒ Body Work; Rep. gr. 66 .



For the vehicles Octavia II, Yeti

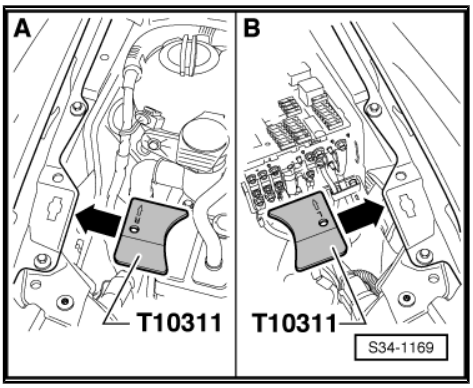
– Position the supporting device - T30099- with the base - T30099/1- and the adapter - MP9-200/3- and support the engine in its installed position.



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For the vehicles Superb II

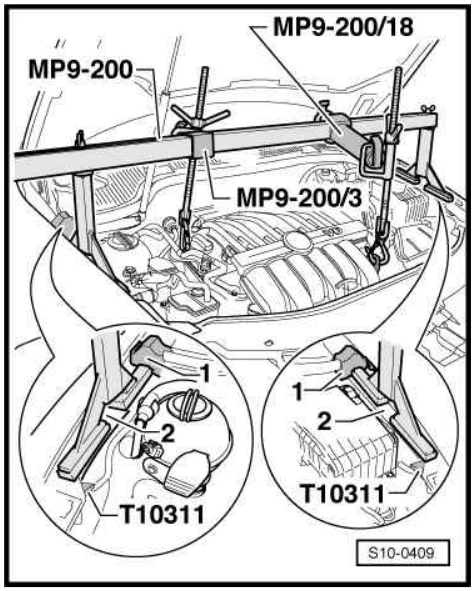
– Insert the wing plate - T10311- on the right vehicle side -A- in the -direction of the arrow- up to the stop. When doing this, the arrow -R- on the wing plate - T10311- points to the rear.
– Also insert the wing plate - T10311- on the left vehicle side -B- in the -direction of the arrow- up to the stop. When doing this, the arrow -L- on the wing plate - T10311- points to the rear.



Note

The wing plates -T10311- ensure that the wings do not get damaged through the weight of the engine/gearbox unit.

– Position the supporting device - MP9-200- with the adapters - MP9-200/3 - and -MP9-200/18- and support the engine/gearbox unit in its installed position.



Note

The legs of the supporting device - MP9-200- must be positioned on the edges of the wings -2- and pushed up to the stops -1-.

Continued for all vehicles

– Uniformly pre-tension the engine/gearbox unit at both spindles, do not raise.

– Remove engine mounts.

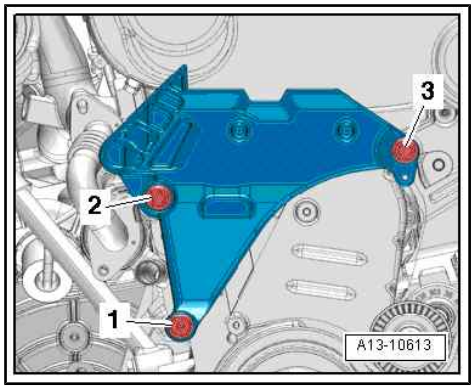
– Remove the front right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

WARNING

Make sure that no components/hoses are damaged, overstretched or torn off when lifting and lowering the engine with the supporting device - T30099- .

Note

The fixing screw -2- is accessible through the hole in the wheelhouse. If necessary, raise or lower the engine via the spindles of the supporting device - MP9-200 (10-222A)- so that the screws -1- and -3- can be removed.



– Unscrew the fixing screws for the engine support bracket in the sequence -3-, -2- and -1-

– Remove the engine support upwards.

Installing

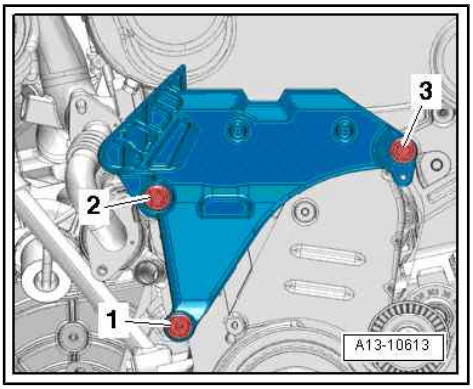
Caution

The tightening sequence and the tightening torque of the fixing screws for the engine support must definitely be respected. Otherwise stress of the engine support bracket occurs, which results in the breaking of the engine support bracket.

Installation is carried out in the reverse order. However, pay attention to the following:

– Place the engine support from the top.

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Note

The installation of the fixing screw -2- is possible through the hole in the wheelhouse. If necessary, raise or lower the engine via the spindles of the supporting device - MP9-200 (10-222A)- so that the screws -1- and -3- can be removed.

– Tighten the fixing screws to 7 Nm in the sequence -1-, -2-, -3-
– Tighten the fixing screws to 40 Nm + 180° in sequence -1-, -2- -3-.
– Install engine mounting with new screws.
– Check the setting of the assembly bracket at the engine:

♦ Octavia II, Yeti
⇒ “1.6.1 Checking and adjusting the assembly mounting (Octavia II, Yeti)”, page 28 .

♦ Superb II
⇒ “1.6.2 Checking and adjusting the assembly bracket (Superb II)”, page 30 .

– Tighten screws for engine mount.

Further installation occurs in reverse order. However, pay attention to the following:

♦ Make sure the fuel lines fit tightly.
♦ Do not mix-up the feed line and the return-flow line (the return-flow line is blue or has a blue marking, the feed line is black).

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

♦ Screws for engine mounting
⇒ “1.5 Assembly overview - assembly mountings”, page 26 .

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13 – Crankshaft group

1 Removing and installing a V-ribbed belt and a toothed belt

⇒ “1.1 Assembly overview - V-ribbed belt drive”, page 38

⇒ “1.2 Assembly overview - toothed belt drive”, page 42

⇒ “1.3 Removing and installing V-ribbed belt for vehicles without air conditioning (Octavia II, Yeti)”, page 46

⇒ “1.4 Removing and installing V-ribbed belt for vehicles with air conditioning system”, page 46

⇒ “1.5 Removing and installing vibration dampener”, page 48

⇒ “1.6 Removing and installing tensioning element for V-ribbed belt”, page 48

⇒ “1.7 Removing and installing toothed belt”, page 49

1.1 Assembly overview - V-ribbed belt drive

⇒ “1.1.1 Vehicles without air conditioning system (Octavia II, Yeti)”, page 38

⇒ “1.1.2 Vehicles with air conditioning”, page 40

1.1.1 Vehicles without air conditioning system (Octavia II, Yeti)

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1 - Crankshaft V-ribbed belt pulley

- ❑ with vibration damper
- ❑ pay attention to correct installation position ⇒ page 39
- ❑ Removing and installing ⇒ “1.5 Removing and installing vibration dampener”, page 48

2 - Screw

- ❑ 23 Nm

3 - Alternator

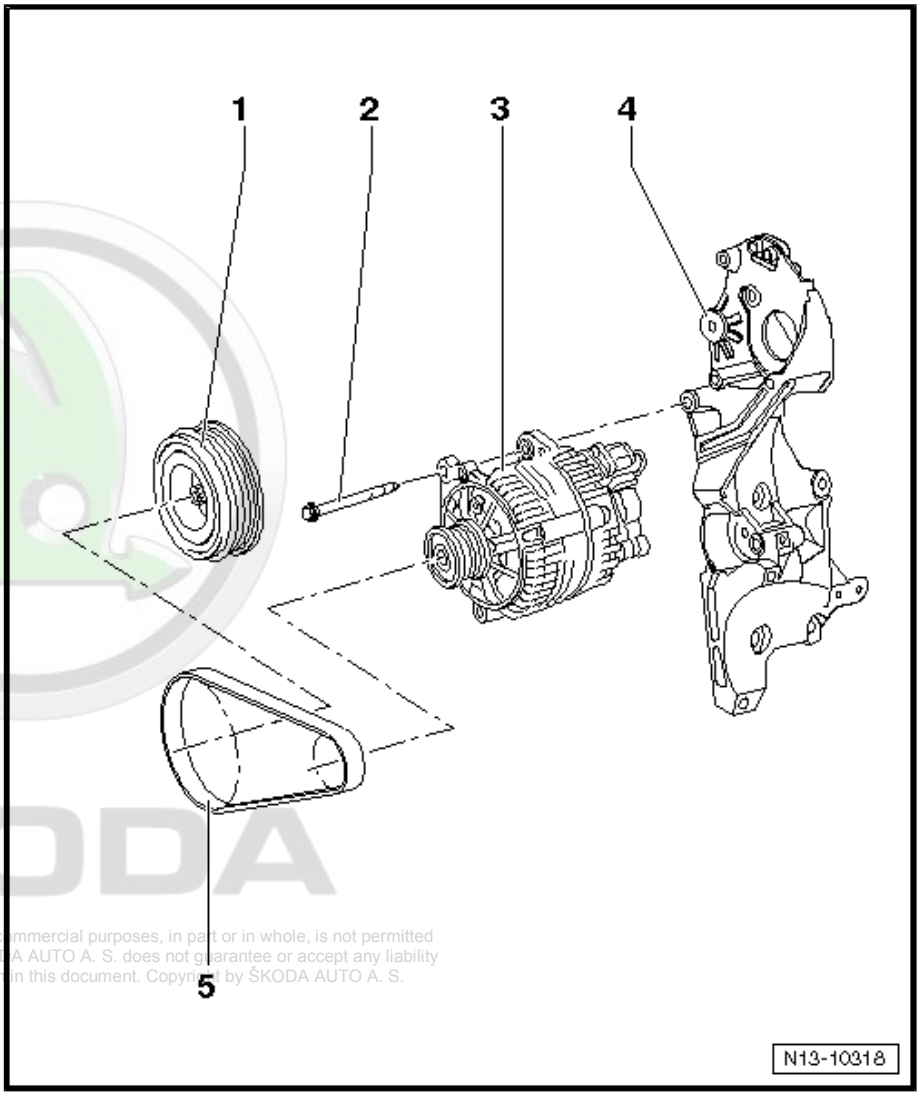
- ❑ Removing and installing ⇒ Electrical System; Rep. gr. 27

4 - Bracket for auxiliary units

- ❑ Tightening sequence ⇒ page 40

5 - V-ribbed belt

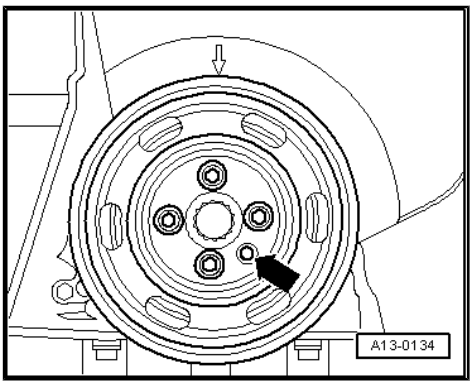
- ❑ Removing and installing ⇒ “1.3 Removing and installing V-ribbed belt for vehicles without air conditioning (Octavia II, Yeti)”, page 46
- ❑ check for wear, replace if damaged
- ❑ pay attention to the correct position on the belt pulley when installing it



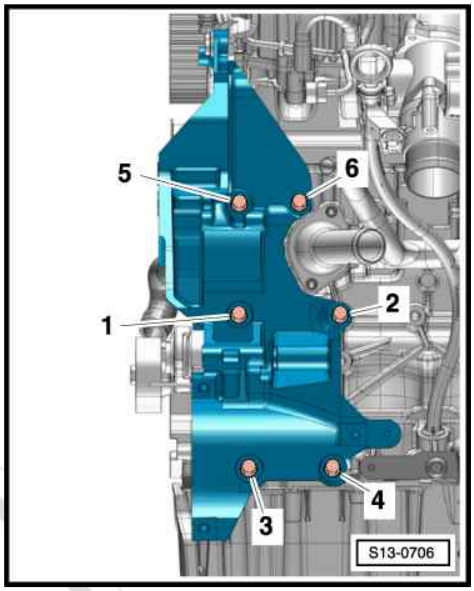
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Installation position of the V-ribbed belt of the pulley crankshaft

- The hole -arrow- in the crankshaft belt pulley must be positioned above the peg on the crankshaft timing belt sprocket.



Bracket for auxiliary units - tightening order and tightening torques



- A dowel sleeve must be located between the bracket for auxiliary units and the cylinder block in the area of the screw hole -6-.

– Insert new fixing screws for the bracket for auxiliary units as follows:

♦ Screws -1- and -2- M10 x 52

♦ Screws -3- and -4- M10 x 30

♦ Screws -5- and -6- M10 x 60

– Gradually tighten the fixing screws for the bracket for auxiliary units in the sequence -1…6-:

1. Screw in all the screws by hand.
2. Tighten all bolts initially to 40 Nm.
3. Torque the screws with a rigid wrench as follows:

   Turn the screws -1- and -2- a further 90°.

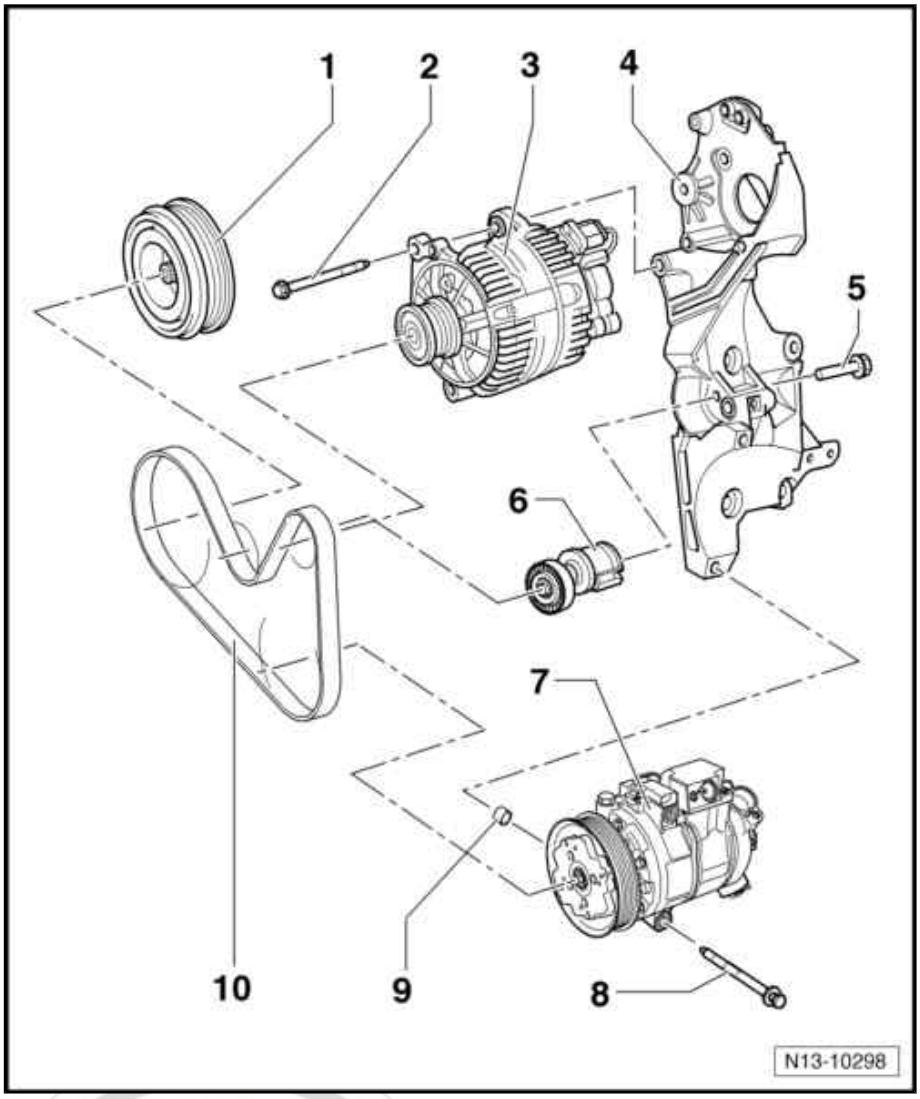
   Turn the screws -3- and -4- a further 45°.

   Turn the screws -5- and -6- a further 90°.

1.1.2 Vehicles with air conditioning

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1 - Crankshaft V-ribbed belt pulley

- ❑ with vibration damper
- ❑ pay attention to correct installation position ⇒ page 41
- ❑ Removing and installing ⇒ “1.5 Removing and installing vibration dampener”, page 48

2 - Screw

- ❑ 23 Nm

3 - Alternator

- ❑ Removing and installing ⇒ Electrical System; Rep. gr. 27

4 - Bracket for auxiliary units

- ❑ Tightening sequence ⇒ page 42

5 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 180°

6 - Tensioning element

- ❑ for the V-ribbed belt

7 - AC compressor

- ❑ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

8 - Screw

- ❑ 23 Nm

9 - Fitting sleeve

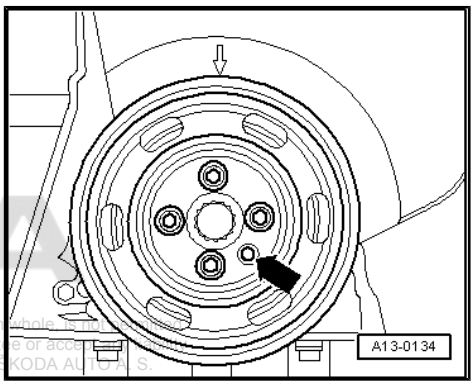
- ❑ pay attention to correct fit in the holder

10 - V-ribbed belt

- ❑ mark the direction of rotation with chalk or a felt-tip pen before removing
- ❑ Removing and installing ⇒ “1.4 Removing and installing V-ribbed belt for vehicles with air conditioning system”, page 46
- ❑ check for wear, replace if damaged
- ❑ pay attention to the correct position on the belt pulley when installing it

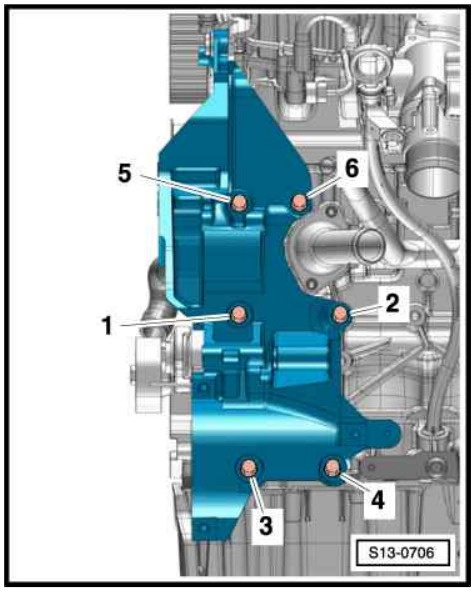
Installation position of the V-ribbed belt of the pulley crankshaft

- The hole -arrow- in the crankshaft belt pulley must be positioned above the peg on the crankshaft timing belt sprocket.



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Bracket for auxiliary units - tightening order and tightening torques



- A dowel sleeve must be located between the bracket for auxiliary units and the cylinder block in the area of the screw hole -6-.

– Insert new fixing screws for the bracket for auxiliary units as follows:

♦ Screws -1- and -2- M10 x 52

♦ Screws -3- and -4- M10 x 30

♦ Screws -5- and -6- M10 x 60

– Gradually tighten the fixing screws for the bracket for auxiliary units in the sequence -1…6-:

1. Screw in all the screws by hand.
2. Tighten all bolts initially to 40 Nm.
3. Torque the screws with a rigid wrench as follows:

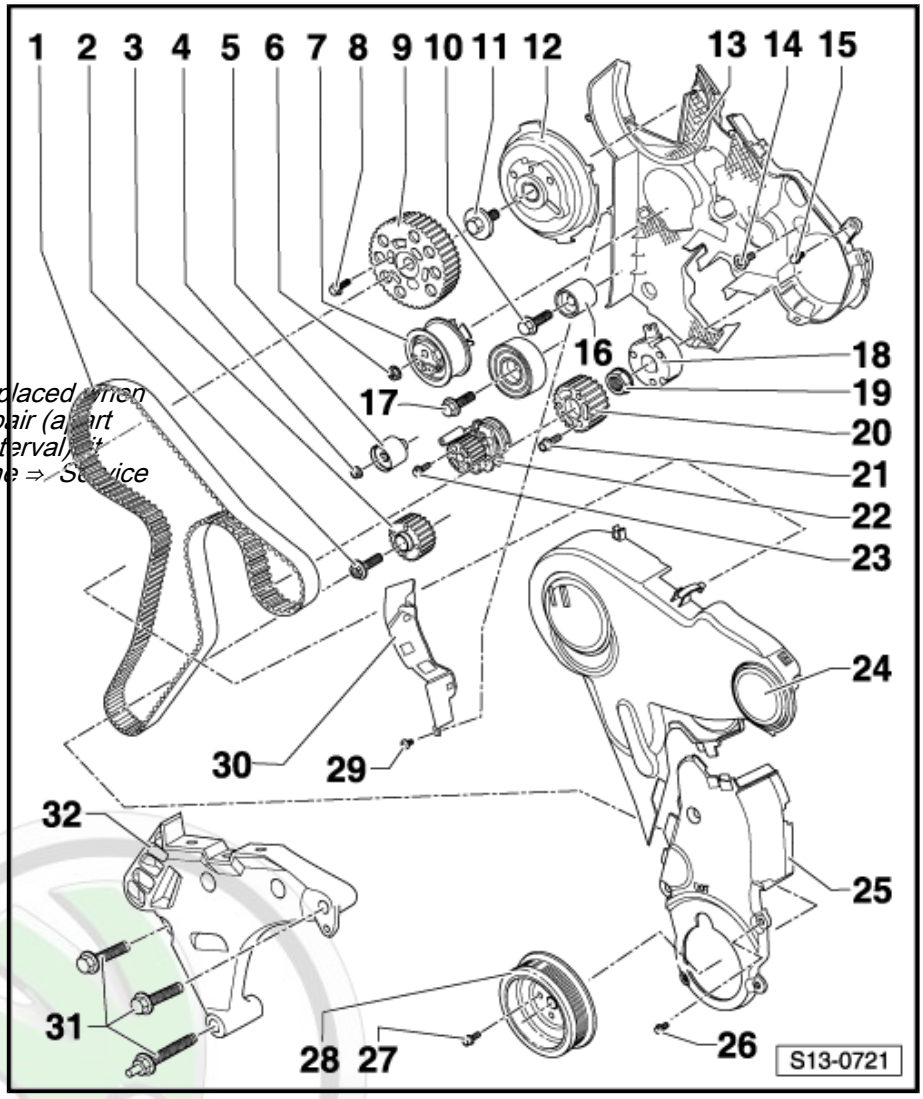
Turn the screws -1- and -2- a further 90°.

Turn the screws -3- and -4- a further 45°.

Turn the screws -5- and -6- a further 90°.

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1.2 Assembly overview - toothed belt drive



1 - Toothed belt

- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ Removing and installing ⇒ “1.7 Removing and installing toothed belt”, page 49

Note

If the toothed belt is replaced when carrying out engine repair (apart from regular change interval), it should be entered in the ⇒ Service Schedule !

2 - Screw

- ❑ Replace after disassembly
- ❑ to release and tighten use counterholder - T30004 (3415)-
- ❑ Neither oil nor grease thread or collar

Tighten in three stages as follows

- ♦ Stage 1 180 Nm
- ♦ 2nd stage, turn 90° further
- ♦ 3rd stage, turn 45° further

3 - Crankshaft toothed belt sprocket

- ❑ there must not be any oil present on the contact surface between the pulley and the crankshaft
- ❑ can be installed only in one position

4 - Nut

- ❑ 20 Nm

5 - Guide pulley

- ❑ for toothed belt

6 - Nut

- ❑ 20 Nm + 45°

7 - Tensioning pulley

- ❑ for toothed belt
- ❑ Pay attention to version ⇒ page 45
- ❑ for removing and installing, remove engine support ⇒ “1.7 Removing and installing engine support”, page 33

8 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 45°

9 - Camshaft toothed belt pulley

10 - Screw

- ❑ 20 Nm

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11 - Screw

- ❑ to release and tighten use counterholder - T10051-
- ❑ 100 Nm

12 - Hub

- ❑ for camshaft
- ❑ to release and tighten use counterholder - T10051-
- ❑ to remove use extractor - T10052-
- ❑ Removing and installing ⇒ “2.3 Removing and installing camshafts”, page 112

13 - Rear toothed belt guard

14 - Screws

- ❑ Attach high pressure pump
- ❑ Replace after disassembly
- ❑ tighten:

- ♦ M8 x 28: 20 Nm + 45°
- ♦ M8 x 90: 20 Nm + 180°

15 - Screw

- ❑ Replace after disassembly
- ❑ 9 Nm

16 - Guide pulley

- ❑ for toothed belt

17 - Screw

- ❑ Replace after disassembly
- ❑ 50 Nm + 90°

18 - Hub

- ❑ for high pressure pump
- ❑ to release and tighten use counterholder - T10051-
- ❑ to remove use extractor - T40064-
- ❑ Removing and installing ⇒ “2.3 Removing and installing the high pressure pump”, page 273

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19 - Nut

- ❑ 95 Nm

20 - Toothed belt pulley high pressure pump

21 - Screw

- ❑ Tightening torque ⇒ “2.1 Summary of components - high pressure pump”, page 268

22 - Coolant pump

- ❑ Removing and installing ⇒ “2.2 Removing and installing coolant pump”, page 167

23 - Screw

- ❑ 15 Nm

24 - Toothed belt guard - top part

- ❑ Assignment ⇒ ETKA - Electronic Catalogue of Original Parts

25 - Toothed belt guard - bottom part

- ❑ Removing and installing ⇒ page 46
- ❑ Assignment ⇒ ETKA - Electronic Catalogue of Original Parts

26 - Screw

- ❑ insert using locking agent - D 000 600 A2-
- ❑ 9 Nm

27 - Screw

- ❑ Replace after disassembly
- ❑ 10 Nm + 90°

28 - Crankshaft V-ribbed belt pulley

- ❑ with vibration damper

29 - Screw

- ❑ 5 Nm

30 - Protection plate

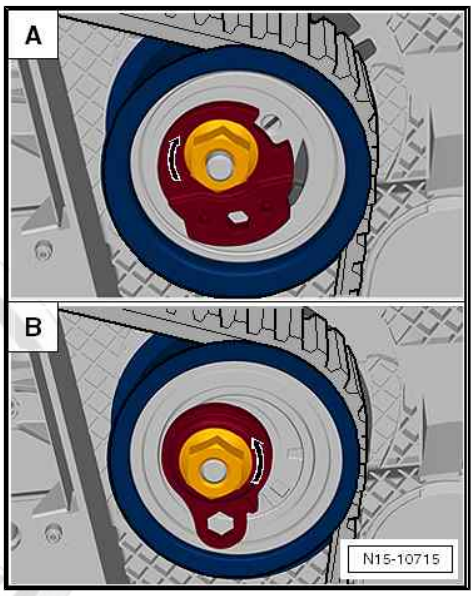
31 - Screw

- ❑ Replace after disassembly
- ❑ Observe tightening sequence ⇒ “1.7 Removing and installing engine support”, page 33
- ❑ 40 Nm + 180°

32 - Engine support bracket

- ❑ Removing and installing ⇒ “1.7 Removing and installing engine support”, page 33

Different versions of tensioning pulleys



Note

- *There are 2 versions of tensioning pulleys installed, which can be exchanged.*
- *The versions differ by the reverse direction of rotation when tensioning. During adjusting work, first check which version of tensioning pulley is installed and then ensure the correct rotation direction of the eccentric element when tensioning the belt.*

Tensioning pulley A

- Use the rig tool - T10265- for installing.
- When installing, ensure that the peg of the base plate of the tensioning pulley is correctly positioned in the opening in the rear timing belt guard ⇒ “1.7 Removing and installing toothed belt”, page 49 .
- Tensioning the timing belt is carried out by turning the eccentric element of the tensioning pulley »clockwise«.

Tensioning pulley B

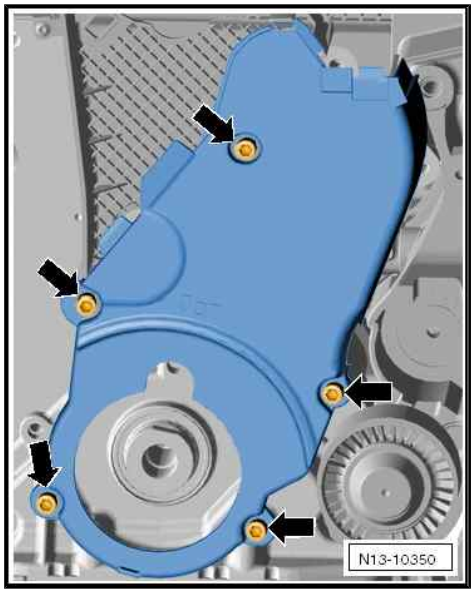
- It is not necessary to use a rig tool for installing.
- The tensioning pulley does not have a peg on the base plate and is not tied up at the opening in the rear timing belt guard (its fitting position is free).
- Tensioning the timing belt is carried out by turning the eccentric element of the tensioning pulley »anti-clockwise«.

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Attach toothed belt guard - bottom part

– Insert screws with locking agent - D 000 600 A2- .

– Tighten screws -arrows- to 9 Nm Pos. -26-.



1.3 Removing and installing V-ribbed belt for vehicles without air conditioning (Octavia II, Yeti)

Note

The repair kit includes the V-ribbed belt, the assembly tool - T10367- and an illustrated work procedure ⇒ ETKA - Electronic Catalogue of Original Parts .

Removing

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Removing the right wheel-well inner panel ⇒ Body Work; Rep. gr. 66 .

– Cut through V-ribbed belt.

Installing

Assembly is carried out in the reverse order. When installing, observe the following:

– The following work procedure is described in the illustrated work procedure from the repair kit.

– Start engine and check ribbed V-belt run.

1.4 Removing and installing V-ribbed belt for vehicles with air conditioning system

Special tools and workshop equipment required

♦ Locking pin - T10060 A-

Removing

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Remove the right wheelhouse liner (bottom part of the wheelhouse liner) ⇒ Body Work; Rep. gr. 66 .

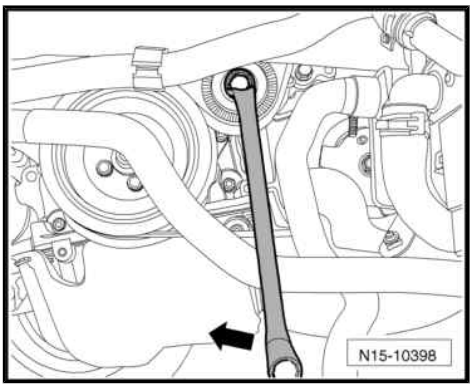
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Caution

When installing, risk of damage through reversing the rotation direction of an already used V-ribbed belt.

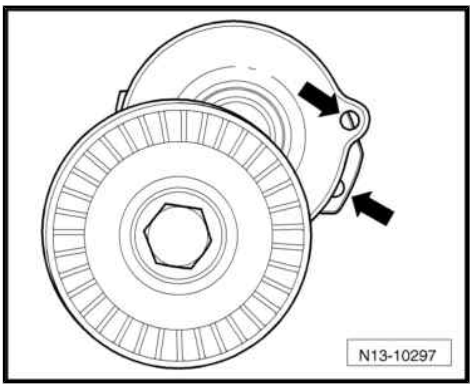
- *If it is intended to re-install the V-ribbed belt, mark the direction of rotation with chalk or a felt-tip pen before removing it.*

– Loosen the V-ribbed belt by swivelling the tensioning element in -the direction of the arrow-.



– Align the holes -arrows- and lock the tensioning element using the locking pin - T10060 A- .

– Remove the V-ribbed belt.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Before fitting the V-ribbed belt make sure that all assemblies (generator and AC compressor) are securely mounted.

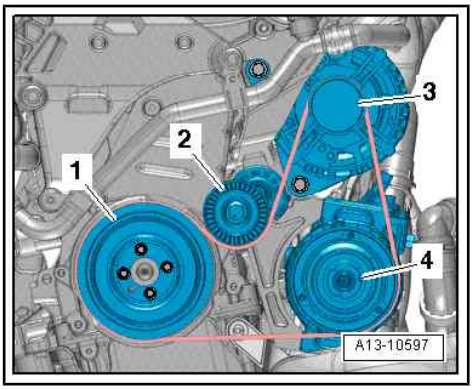
– Lay the V-ribbed belt onto the V-ribbed belt pulleys.

1 - V-ribbed belt of the crankshaft with vibration damper

2 - Tensioning element

3 - Alternator

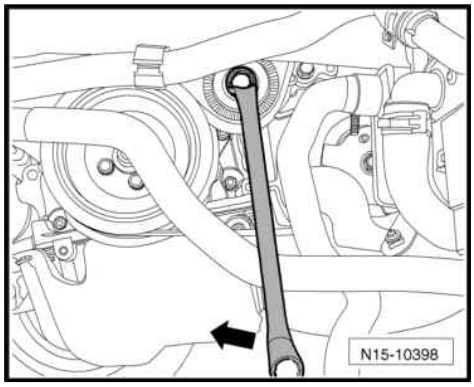
4 - AC compressor



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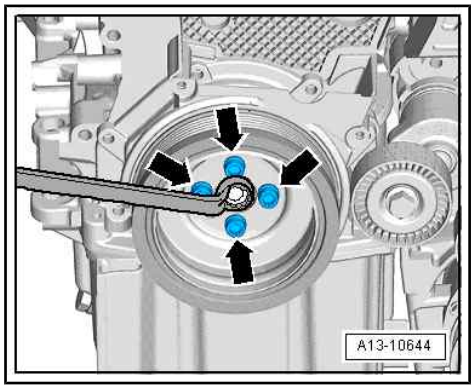
– Hold the tensioning element with the ring spanner and pull out the locking pin - T10060 A- .
– Release the tensioning element.
– Check correct positioning of the V-ribbed belt.
– Start engine and check ribbed V-belt run.



1.5 Removing and installing vibration dampener

Removing

– Remove V-ribbed belt
⇒ “1 Removing and installing a V-ribbed belt and a toothed belt”, page 38 .
– Remove the cover for the vibration damper.
– Loosen the screws -arrows- of the vibration damper, to do so hold the screw for the crankshaft timing belt sprocket using the ring spanner.
– Unscrew screws and remove vibration dampener.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Note the fitting position of the vibration damper ⇒ page 41 or ⇒ page 39 .*
- *Replace the screws for the V-ribbed belt pulley crankshaft.*

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

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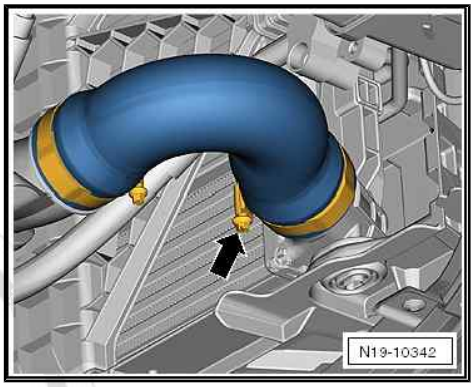
- Screws for belt pulley
⇒ “1.2 Assembly overview - toothed belt drive”, page 42 .

1.6 Removing and installing tensioning element for V-ribbed belt

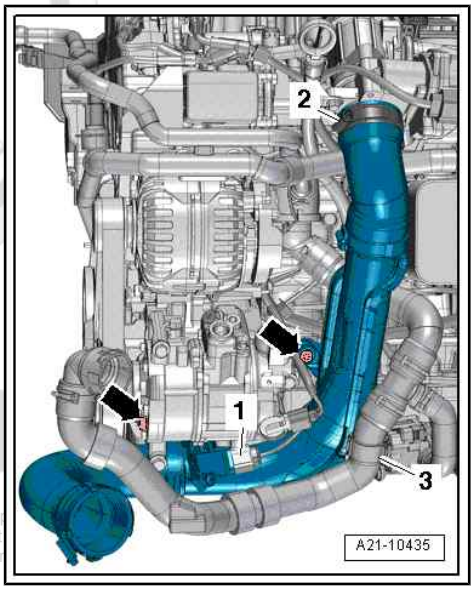
Removing

– Remove V-ribbed belt
⇒ “1.4 Removing and installing V-ribbed belt for vehicles with air conditioning system”, page 46 .

– Remove right charge air hose.
– Remove fan shroud with radiator fans
⇒ “3 Radiator and radiator fan”, page 172 .



– Remove screws -arrows-.
– Detach coolant hose -3-.
– Loosen hose clamp -2-.
– Disconnect the plug -1- at the charge pressure sender - G31- with intake air temperature sender - G42- and remove the right charge air pipe.



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– Unscrew screw -2- and remove tensioning element -1- from V-ribbed belt.

Installing

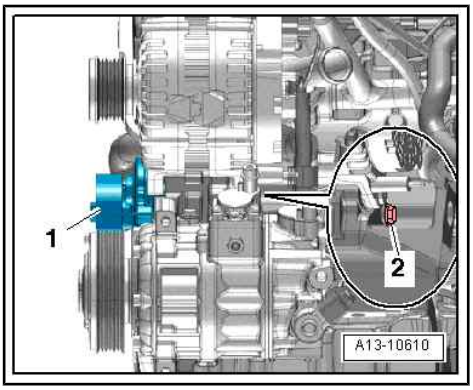
Assembly is carried out in the reverse order. When installing, observe the following:

– Replace the screw of the tensioning element for the V-ribbed belt.
– Install the V-ribbed belt
⇒ “1.4 Removing and installing V-ribbed belt for vehicles with air conditioning system”, page 46 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.



♦ Screw for the tensioning element
⇒ “1.1.2 Vehicles with air conditioning”, page 40 .

1.7 Removing and installing toothed belt

Special tools and workshop equipment required

♦ Rig pin for injection pump - 3359- (2x)
♦ Crankshaft arrester - T10050-

- Locking pin - T10060 A-
- Counterholder - T10172- with bolts - T10172/4- and bolts - T10172/9-
- Offset screwdriver - T10264-
- Flywheel lock - T10265-
- Socket insert XZN 10 - T10385-
- Pliers for spring-type clips

Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- *If the toothed belt is replaced when carrying out engine repair (apart from regular change interval), it should be entered in the ⇒ Service Schedule !*
- *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- *To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.*

Note

- *Safety precautions when working on the fuel supply system* *⇒ “2.1 Safety precautions when working on fuel supply system”, page 4* .
- *Observe rules for cleanliness* *⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6* .
- *The engine support does not have to be removed in order to remove the camshaft sprocket.*
- *On vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be disconnected.*

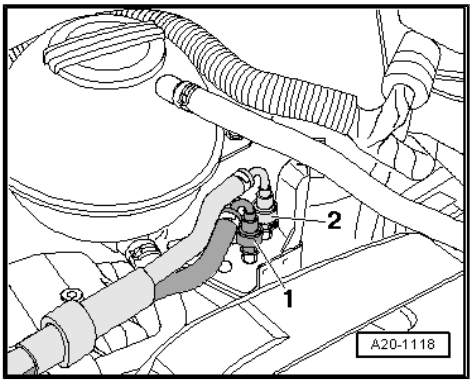
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– Put the shift lever into Neutral or the selector lever into position “N” in order to turn the crankshaft.
– Switch off ignition and pull out ignition key.

Removing

– Remove engine cover ⇒ “1.1 Removing and installing engine trim panel”, page 11 .
– Remove noise insulation ⇒ Body Work; Rep. gr. 66 .

– Detach fuel feed line -2- and fuel return-flow line -1-, to do so press in securing ring. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .

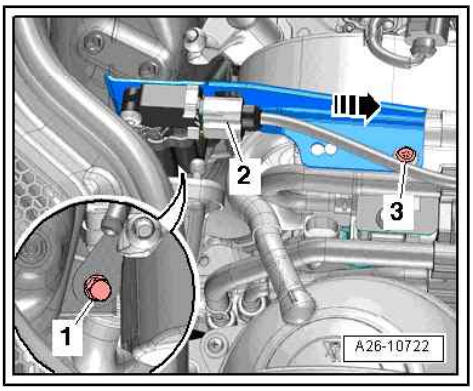


Vehicles with engine identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

– Disconnect plug -2- at differential pressure indicator - G505- .

– Screw out screw -3- and remove bracket with differential pressure indicator - G505- from the bracket of the additional fuel pump in -direction of arrow-.

– Place the bracket with the differential pressure indicator - G505- to the rear.



Caution

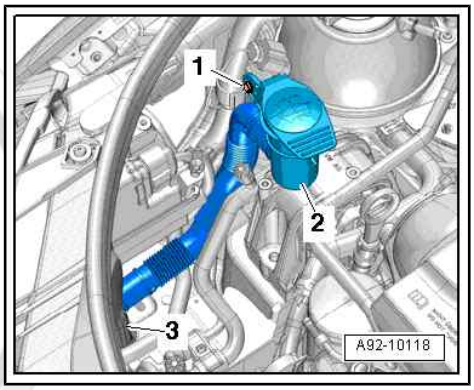
Risk of damage!

- *The differential pressure indicator - G505- is very sensitive and must not touch somewhere when laying it down with the bracket.*

Continued for all vehicles

– Unscrew bolt -1-.

– Push the filler tube with the filler neck -2- for the washer-fluid reservoir to the side.



Note

For reasons of clarity the fuel filter is not shown.

– Unhook the fuel hose -2- from the bracket.

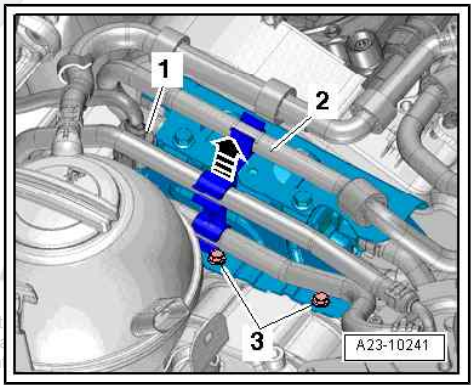
– Remove the bracket for the fuel lines upwards in -direction of arrow- and place it to the side.

– Disconnect the plug -1- from the additional fuel pump - V393- or from the fuel pump 2 - V277- .

– Unscrew screws -3-.

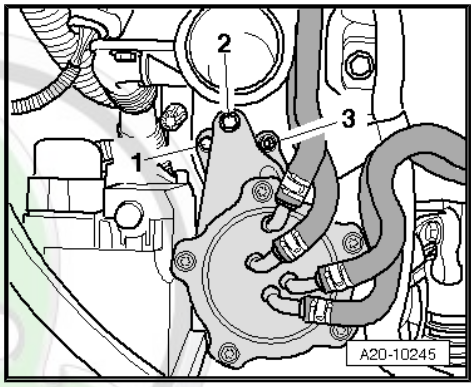
– Unplug connector from expansion reservoir.

– Unscrew screw for expansion reservoir.

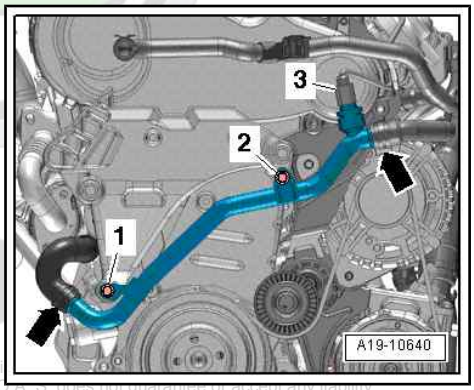


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– Loosen screw -1- by 2 turns.
– Release screw -2- and nut -3-.
– Unclip bracket for coolant line at fuel filter.
– Lay the coolant expansion tank with the hoses connected and the fuel filter with the hoses connected onto the engine.

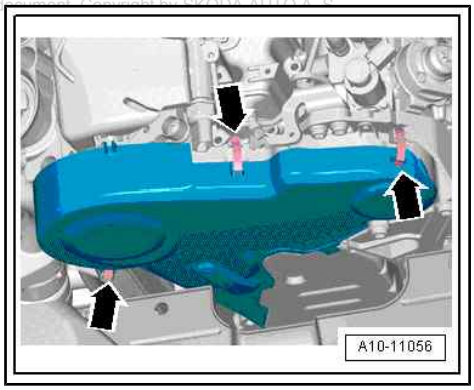


– Disconnect plug -3- at the coolant temperature sender at radiator outlet - G83- .
– Unscrew nut -1- and screw -2-.
– Press the right coolant pipe with the hoses connected -arrows- to the side.



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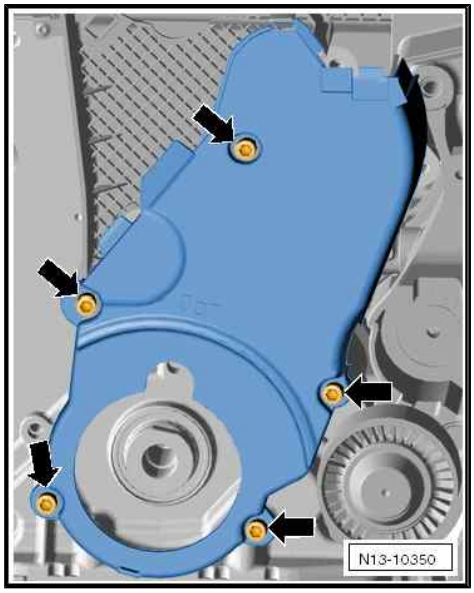
– Remove top part of toothed belt guard; to do so release retaining clips -arrows-.
– Remove poly V-belt pulley from crankshaft.



Note

Do not lock tensioning element for V-ribbed belt.

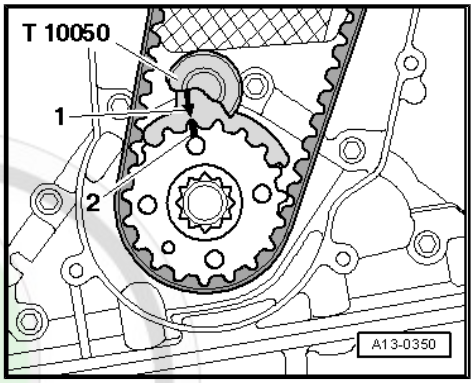
– Remove screws -arrows-.
– Remove bottom part of toothed belt guard.



Note

The engine support must be removed to replace the tensioning pulley ⇒ *“1.7 Removing and installing engine support”, page 33* .

– Rotate the crankshaft in direction of rotation of engine at top dead centre and remove the toothed belt sprocket of the crankshaft with the crankshaft arrester - T10050- . To do so, slide the crankshaft arrester from the front side of the timing belt sprocket into its teeth.



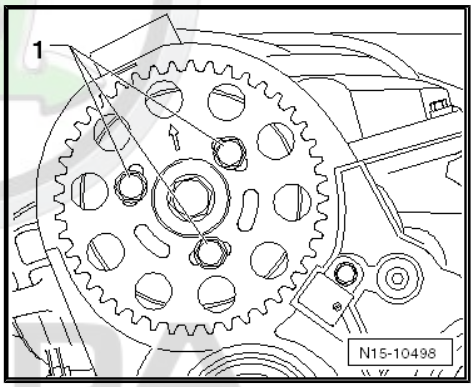
Note

The markings on the toothed belt sprocket of the crankshaft -2- and on the crankshaft arrester - T10050- -1- must be aligned. While doing so, the stud of the crankshaft arrester - T10050- must engage in the hole of the sealing flange.

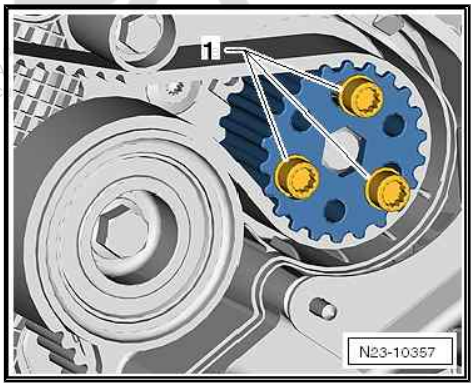
- The arrow on the camshaft sprocket must be close to the »12 o'clock« position.

  If the arrow is close to the »6 o'clock« position, torque the crankshaft by 1 turn (360°).

– Slacken screws -1- for camshaft sprocket by approx. 90°. For this purpose, counterhold the camshaft timing gear using the counterholder - T10172- with bolts - T10172/4- .



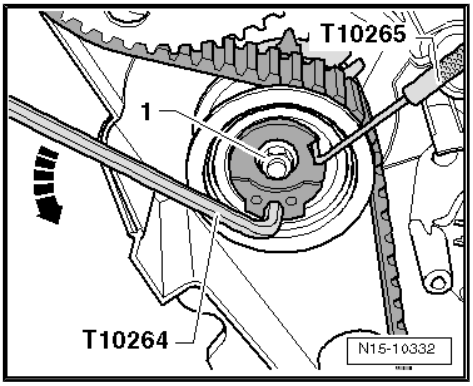
– Slacken the screws -1- for the toothed belt sprocket at the high pressure pump by approx. 90° using the socket insert XZN 10 - T10385- . For this purpose, counterhold the camshaft timing gear using the counterholder - T10172- with bolts - T10172/9- .



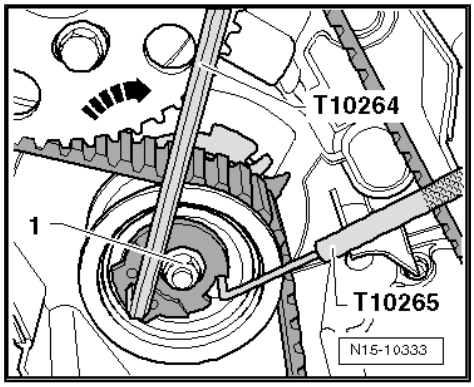
Tensioning pulley A

– Loosen nut -1- for tensioning pulley.

– Turn the eccentric of the tensioning pulley with the offset screwdriver - T10264- in -direction of arrow- (anti-clockwise) until the tensioner pulley can be interlocked with the extractor - T10265- .



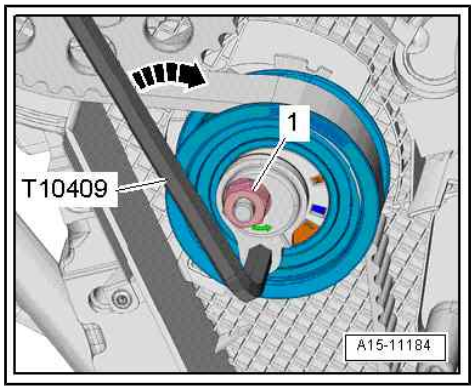
– Afterwards, turn the eccentric of the tensioning pulley with the offset screwdriver - T10264- in -direction of arrow- up to the stop and tighten nut -1- by hand.



Tensioning pulley B

– Loosen nut -1- for tensioning pulley.

– Turn the eccentric of the tensioning pulley in -direction of arrow- (clockwise) using the offset screwdriver - T10409- until the tensioning pulley is slackened (eccentric element in approx. 9 o'clock position) and tighten the nut -1- by hand.



Caution

When installing, risk of damage through reversing the rotation direction of an already used toothed belt.

- ***If the toothed belt is re-installed, mark the direction of rotation with chalk or a felt-tip pen before removing it.***

– First of all remove the toothed belt from the large guide pulley and then from the remaining toothed belt gears.

Installing (set the timing)

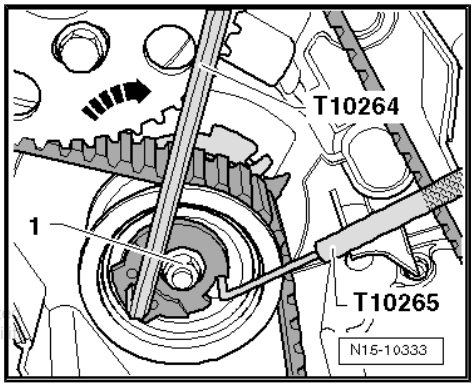
Note

- *Adjusting work on the timing belt must only be performed on a cold engine, as the position of the pointer at the tensioning element is temperature dependent.*
- *If it is intended to replace the tensioning pulley, the engine support must be removed*
  ⇒ "1.7 Removing and installing engine support", page 33 .

Conditions

Tensioning pulley A

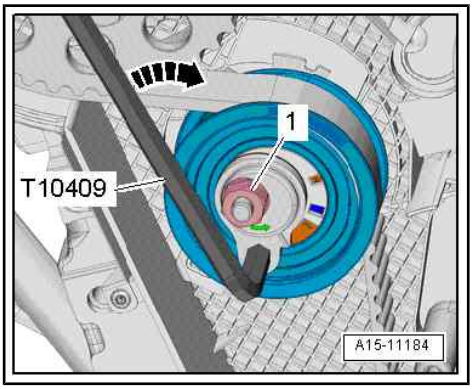
- Tensioning pulley locked with rig tool - T10265- and fixed with nut up to right stop.



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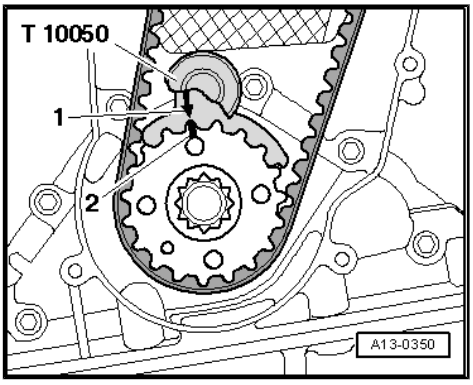
Tensioning pulley B

- The tensioner of the tensioning pulley is in the 9 o'clock position.
- The tensioning pulley is loose and the nut -1- is tightened to 2 up to 4 Nm.



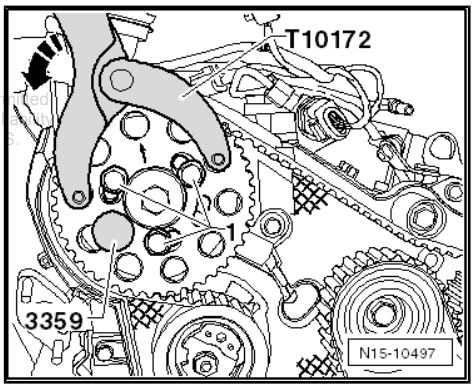
Proceed as follows for both tensioning pulleys

- Lock the crankshaft with the crankshaft arrester - T10050- .
- The screws for the camshaft sprocket are replaced and loosely tightened. It must still be possible to just turn the toothed belt sprocket, however it must not hang loose.

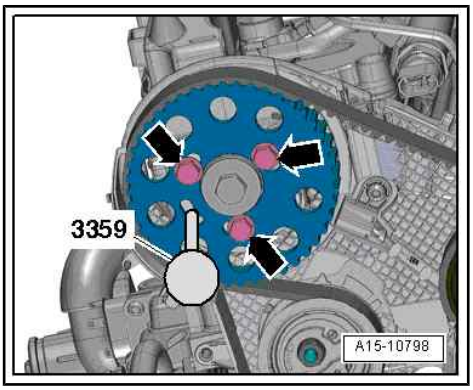


Note

If necessary, turn the hub of the camshaft using the counterholder - T10172- with adapters - T10172/4- until it can be locked. To do so tighten at least one fixing screw -1- by hand.

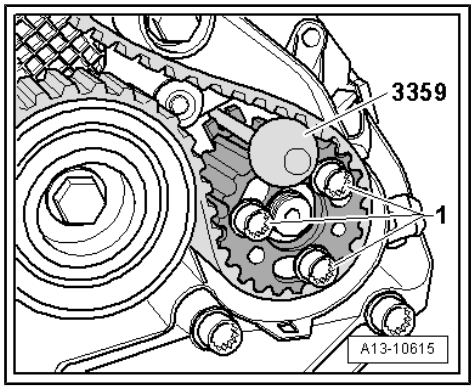


– Lock the hub of the camshaft with the rig pin for injection pump - 3359- . To do so, insert rig pin through the open elongated hole in the cylinder head bore.
– Loosen again the screws which were tightened by hand -arrows-.



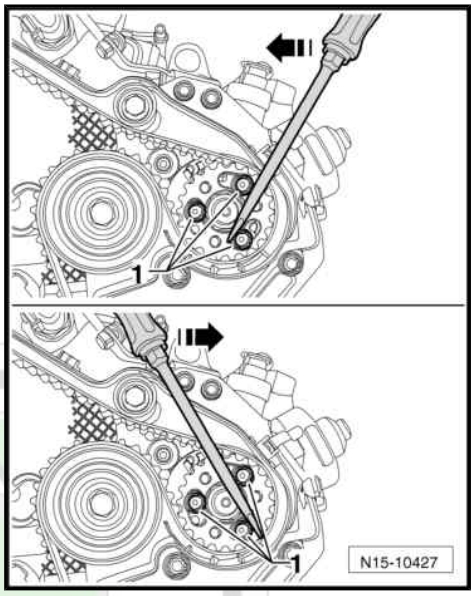
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– Lock the hub of the high pressure pump with the rig pin for injection pump - 3359- . To do so, insert the rig pin into the hole of the timing belt gear from the outside.



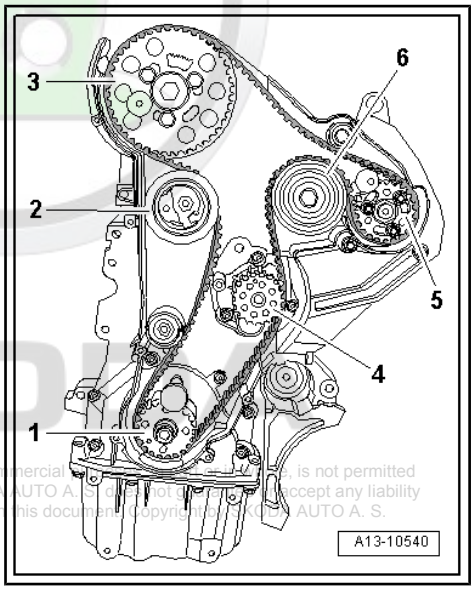
Note

If necessary, use a screwdriver to turn the hub of the high pressure pump at the screw heads -1- until the hub can be locked with the rig pin.



– Turn the toothed belt sprocket of the camshaft -3- and the toothed belt sprocket of the fuel high pressure pump -5- clockwise in their elongated holes for screws as far as the stop.
– Fit the toothed belt in the following order:

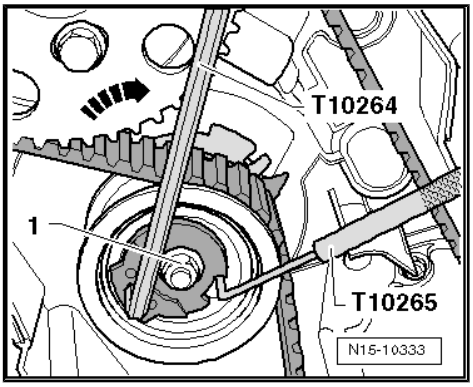
1 - Crankshaft toothed belt sprocket
2 - Tensioning pulley
3 - Camshaft toothed belt pulley
4 - Coolant pump toothed belt pulley
5 - Toothed belt pulley high pressure pump
6 - Guide pulley



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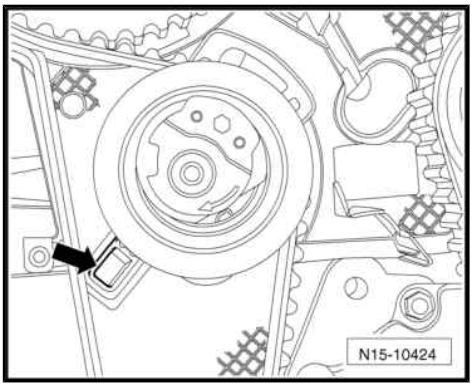
Tensioning pulley A

– Loosen nut -1- for tensioning pulley and remove rig tool - T10265- .



Note

Pay attention to correct fitting of the tensioning pulley in the rear timing belt cover -arrow-.

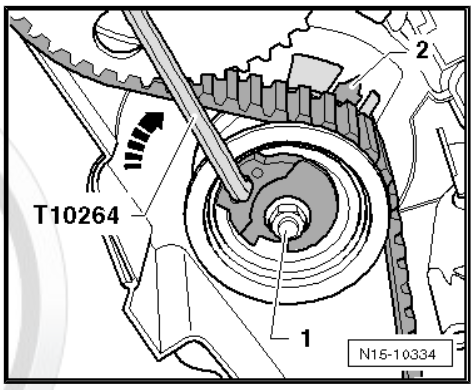


– Turn the eccentric of the tensioning pulley with the offset screwdriver - T10264- clockwise -arrow- until the pointer -2- is in the centre of the base plate in front of the gap.

• The nut -1- must not turn along.

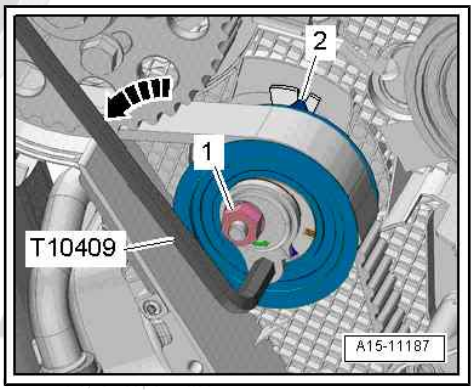
– Hold tensioning pulley in this position and tighten nut -1-.

Tightening torque: 20 Nm + 45°



Tensioning pulley B

– Carefully turn the eccentric of the tensioning pulley with the offset screwdriver - T10409- anti-clockwise and position the pointer -2- in the centre of the base plate in the gap. Ensure that the fixing nut -1- does not turn along.

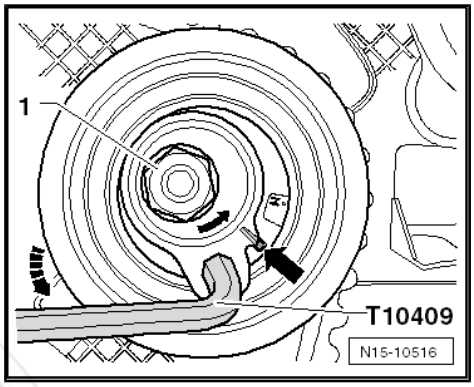


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The markings -arrow- on the eccentric element and the tensioning pulley are nearly aligned.

– Hold tensioning pulley in this position and tighten nut -1-.

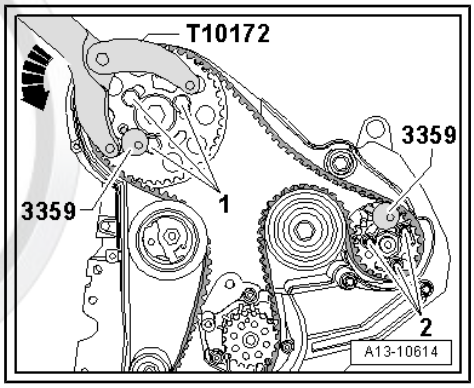
  Tightening torque: 20 Nm + 45°



Proceed as follows for both tensioning pulleys

– Fit counterholder - T10172- with bolts - T10172/4- onto camshaft sprocket and press in -direction of arrow-.

– Maintain pre-tensioning and initially tighten screws -1- for camshaft sprocket to 20 Nm.



Note

The screws for the camshaft sprocket must be turned further after completion of setting and after timing testing ⇒ page 60 .

– Tighten screws -2- for toothed belt pulley on the high pressure pump. For this purpose, counterhold the camshaft timing gear using the counterholder - T10172- with bolts - T10172/9- .

  Tightening torque: 20 Nm

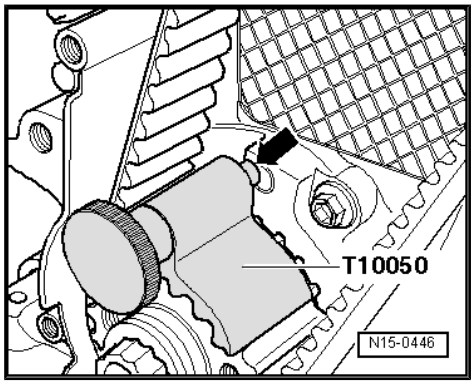
– Remove rig pin for diesel injection pump - 3359- and crankshaft arrester - T10050- .

Checking valve timing

– Turn the crankshaft at the central screw for timing belt gear 2 turns in the direction of running of the engine until the crankshaft is positioned shortly before “TDC”.

– Position the crankshaft arrester - T10050- on the toothed belt sprocket of the crankshaft.

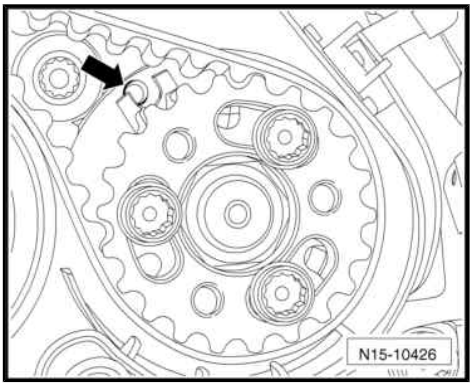
– Turn the crankshaft in the direction of rotation of the engine until the bolt -arrow- of the crankshaft arrester engages during this rotary movement into the hole in the sealing flange.



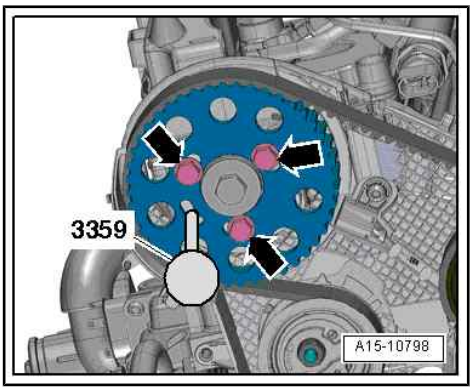
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Note

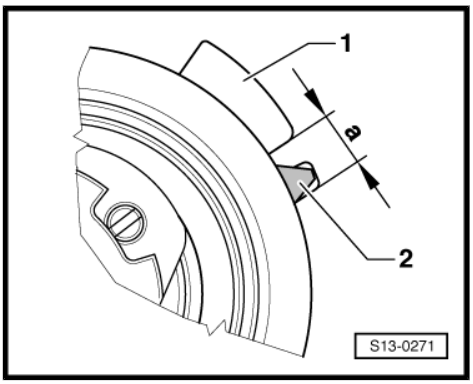
The removal of the crankshaft and camshaft is limited in the following test. The removal point of the hub of the fuel high pressure pump is always difficult to find again. A slight difference -arrow- does not influence the engine running.



Conditions



- The hub of the camshaft must be locked with the rig pin for injection pump - 3359- .
- The pointer of the tensioning pulley -2- must be in the area -a- of the base plate -1-.



If the conditions are not fulfilled:

– Correct timing ⇒ page 59 .

If the conditions are fulfilled:

– Continued if the timing is correctly set ⇒ page 60 .

Correct timing

– Push the crankshaft arrester - T10050- until its locking bolt pushes out of the hole in the sealing flange.

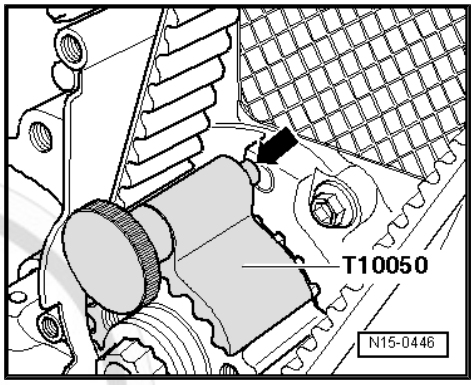
– Turn out the crankshaft opposite to the running direction of the engine to slightly before “TDC”.

– Now slowly turn the crankshaft in the running direction of the engine, until the hub of the camshaft can be locked during this rotary movement with the rig pin for the injection pump - 3359- .

– Slacken the fixing screws for the camshaft sprocket on the locked hub of the camshaft sprocket.

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– Check the position of the bolt of the crankshaft arrester - T10050- to the hole in the sealing flange:



If the bolt of the crankshaft arrester - T10050- is positioned to the left of the hole:

– Slowly turn the crankshaft in the direction of rotation of the engine until the bolt of the crankshaft arrester - T10050- engages into the hole in the sealing flange.

– First tighten the fixing screws for the camshaft toothed belt sprocket to 20 Nm.

Note

The screws must be further turned according to the setting of the timing ⇒ page 60 .

If the bolt of the crankshaft arrester - T10050- is positioned to the right behind the hole:

– First of all turn the crankshaft slightly against the direction of rotation of engine until the bolt is positioned to the left in front of the hole.

– Slowly turn the crankshaft in the direction of rotation of the engine until the bolt of the crankshaft arrester - T10050- engages into the hole in the sealing flange.

– First tighten the fixing screws for the camshaft toothed belt sprocket to 20 Nm.

Note

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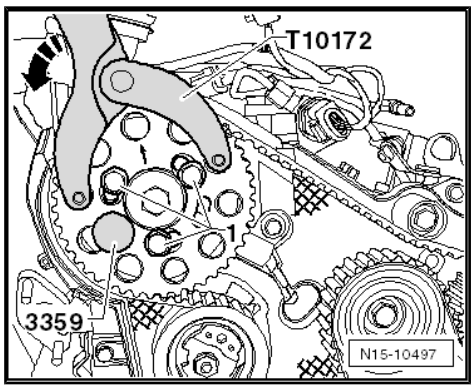
The screws must be further turned according to the setting of the timing ⇒ page 60 .

Continued if the timing is correctly set

– Remove rig pin for diesel injection pump - 3359- and crankshaft arrester - T10050- .

– Once again test timing ⇒ page 58 .

If the hub of the toothed belt sprocket of the camshaft can now be removed:



– Tighten fixing screws for camshaft sprocket further 45° with a rigid wrench. During this process, counterhold belt pulley with counterholder - T10172- with bolt - T10172/4- .

Further installation occurs in reverse order to removal.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

♦ Summary of components
⇒ “1.2 Assembly overview - toothed belt drive”, page 42 .

2 Sealing flanges and flywheel

⇒ “2.1 Summary of components - sealing flange on the belt pulley side”, page 61

⇒ “2.2 Summary of components - sealing flange on the gearbox side”, page 62

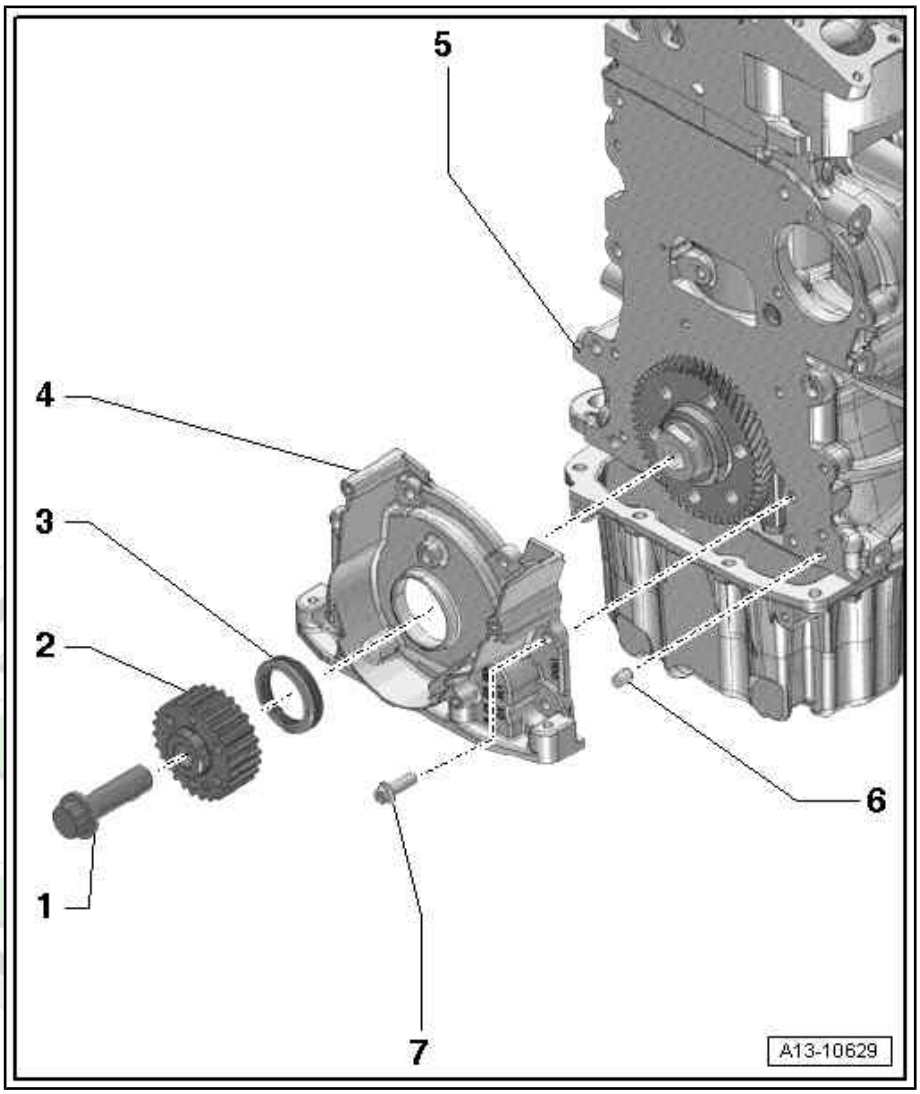
⇒ “2.3 Replacing crankshaft sealing ring on the belt pulley side”, page 64

⇒ “2.4 Removing and installing the sealing flange on the belt pulley side”, page 65

⇒ “2.5 Removing and installing sealing flange on gearbox side”, page 67

⇒ “2.6 Removing and installing flywheel”, page 74

2.1 Summary of components - sealing flange on the belt pulley side



1 - Screw

- ❑ Replace after disassembly
- ❑ do not apply additional oil or grease to the thread and collar

Tighten in three stages as follows

- ♦ Stage 1 180 Nm
- ♦ 2nd stage, turn 90° further
- ♦ 3rd stage, turn 45° further

2 - Crankshaft toothed belt sprocket

- ❑ there must not be any oil present on the contact surface between the pulley and the crankshaft
- ❑ can be installed only in one position

3 - Sealing ring

- ❑ Replace ⇒ “2.3 Replacing crankshaft sealing ring on the belt pulley side”, page 64
- ❑ do not oil or grease

4 - Sealing flange

- ❑ Belt pulley end
- ❑ must be positioned on dowel sleeves
- ❑ Removing and installing ⇒ “2.4 Removing and installing the sealing flange on the belt pulley side”, page 65

5 - Cylinder block

6 - Dowel sleeves

- ❑ 2 units

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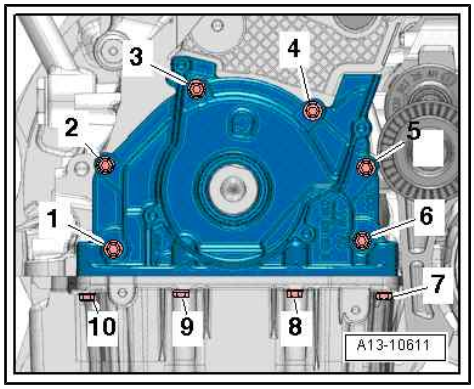
7 - Screw

- ❑ Tightening torque and tightening order ⇒ page 62
- ❑ 15 Nm

Sealing flange on the belt pulley side - tightening torque and tightening order

– Tighten screws in steps in the given sequence:

Step	Screws	Tightening torque
1.	-1 … 10-	Tighten by hand as far as the stop
2.	-1 … 6-	crosswise in steps up to 15 Nm
3.	-7 … 10-	15 Nm

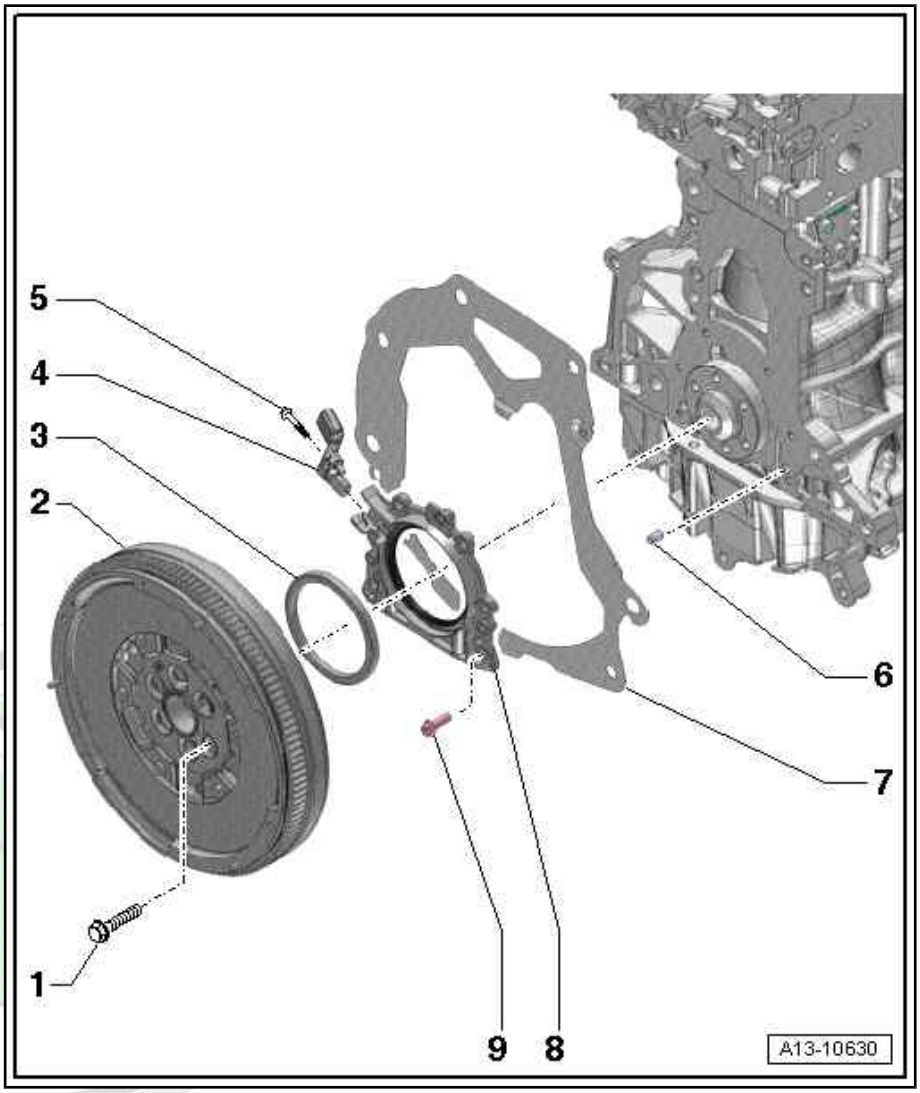


2.2 Summary of components - sealing flange on the gearbox side

Note

Repairs to the clutch ⇒ Gearbox; Rep. gr. 30 .

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1 - Screw

- ❑ Replace after disassembly
- ❑ 60 Nm + 90°

2 - Dual-mass flywheel

- ❑ Inspect proper operation ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ “2.6 Removing and installing flywheel”, page 74
- ❑ Installation is only possible in one position through offset holes

3 - Rotor

- ❑ Engine speed sender - G28-
- ❑ Component part of the sealing flange on the gearbox side Pos. -8-

4 - Engine speed transmitter - G28-

- ❑ Removing and installing ⇒ “1.4 Removing and installing the engine speed transmitter G28 ”, page 266

5 - Screw

- ❑ 5 Nm

6 - Dowel sleeves

- ❑ 2 units

7 - Intermediate plate

- ❑ must be positioned on dowel sleeves
- ❑ do not damage/bend during assembly work
- ❑ hang on the sealing flange ⇒ page 63

8 - Sealing flange on the gearbox side

- ❑ can only be replaced complete with sealing ring and rotor for engine speed sender - G28-
- ❑ Replace ⇒ “2.5 Removing and installing sealing flange on gearbox side”, page 67

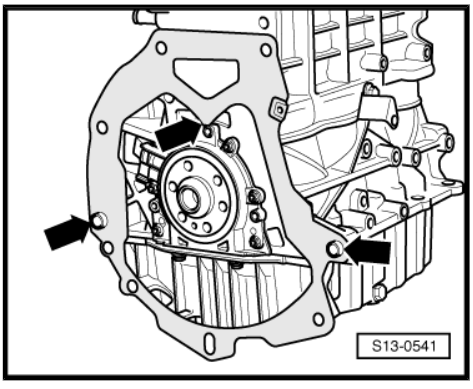
9 - Screw

- ❑ Tightening torque and tightening order ⇒ page 64

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Install intermediate plate

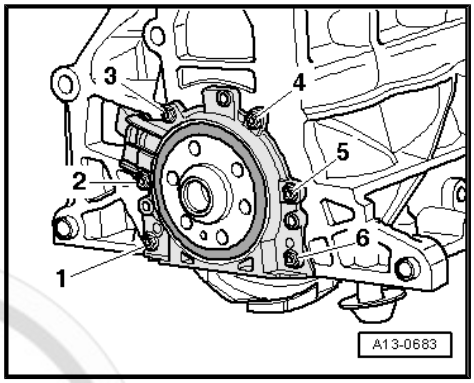
– Insert intermediate plate on sealing flange -top arrow- and push onto the dowel sleeves -bottom arrows-.



Sealing flange on the gearbox side - tightening torque and tightening order

– Tighten screws in steps in the given sequence:

Step	Screws	Tightening torque
1.	-1 … 6-	Tighten by hand as far as the stop
2.	-1 … 6-	crosswise in steps up to 15 Nm



2.3 Replacing crankshaft sealing ring on the belt pulley side

Special tools and workshop equipment required

- Counterholder - T30004 (3415)- or counterholder for toothed belt sprocket - MP1-310 (3099)-
- Sealing ring extractor - MP1-226 (3203)-
- Assembly tool - T10053-

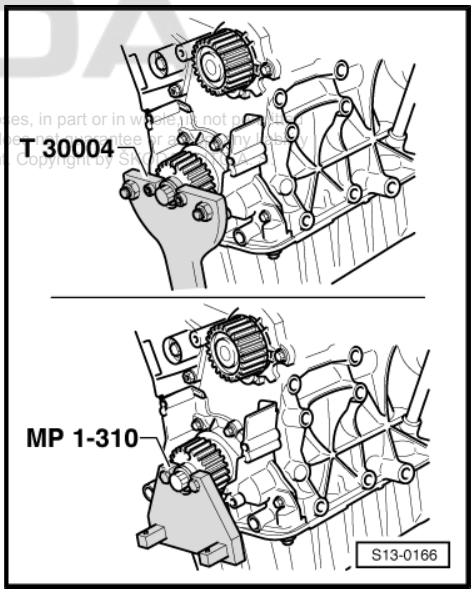
Removing

• Engine installed.

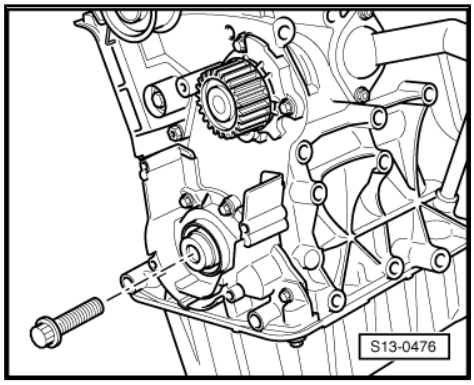
– Remove toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Remove crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder - T30004- or counterholder - MP1-310- .

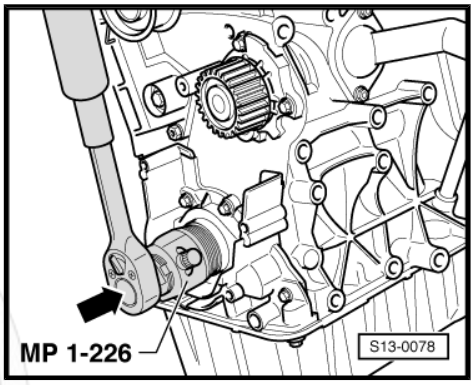
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– To guide the gasket ring extractor - MP1-226- screw the central screw for the toothed belt sprocket crankshaft fully into the crankshaft by hand.



– Turn inner part of gasket ring extractor - MP1-226- two turns (approx. 3 mm) out of the outer part and secure with knurled screw.
– Oil the thread head of the sealing ring extractor, position and fix screw into the sealing ring as far as possible.
– Release knurled screw and turn the inner side against the crankshaft until the gasket ring is pulled out.
– Clamp gasket ring extractor into the vice and remove gasket ring with pliers.
– Clean the contact and sealing surfaces.

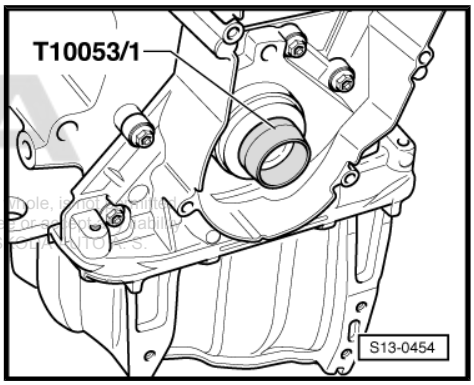


Installing

Note

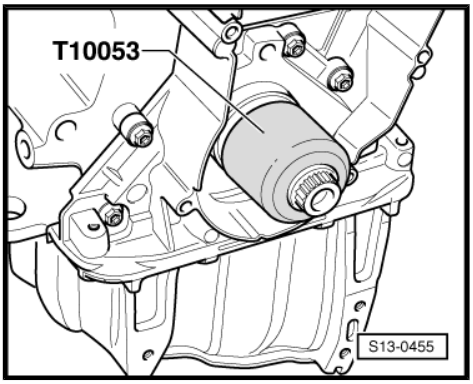
Do not oil the sealing lip and the outer surface of the new gasket ring before the pressing in procedure.

– Remove oil residue on the crankshaft journal with a clean cloth.
– Insert guide bushing - T10053/1- on the crankshaft bearing pin.
– Slide gasket ring over the guide bushing.



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– Press in the gasket ring flush with the central screw for the crankshaft toothed belt sprocket and with the pressure bushing of the assembly device - T10053- .



Note

- *There must not be any oil present on the contact surface between toothed belt sprocket and crankshaft.*
- *Replace central screw for crankshaft toothed belt sprocket.*
- *Do not oil the central screw for crankshaft toothed belt sprocket.*
- *Tighten central screw*
  ⇒ “1.2 Assembly overview - toothed belt drive”, page 42 .

– Install crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder - T30004- .
– Install the toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .

2.4 Removing and installing the sealing flange on the belt pulley side

Special tools and workshop equipment required

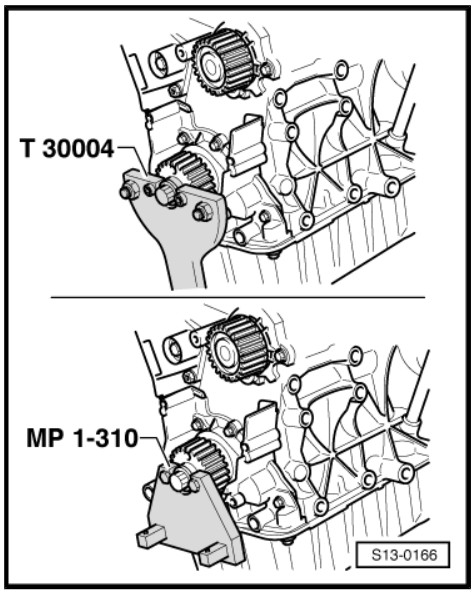
- Counterholder - T30004 (3415)- or counterholder for toothed belt sprocket - MP1-310 (3099)-
- Assembly tool - T10053-
- Protective goggles and gloves
- Sealant remover Gasket Stripper (stock code GST, stock item No. R 34402), manufacturer Retech s.r.o.
- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Silicone sealant ⇒ ETKA - Electronic catalogue of original parts

Removing

- Engine installed.

– Remove toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Remove crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder - T30004- or counterholder - MP1-310- .



– Drain engine oil:
- ⇒ Maintenance ; Booklet Octavia II
- ⇒ Maintenance ; Booklet Superb II
- ⇒ Maintenance ; Booklet Yeti

– Removing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

– Unscrew the fixing screws of the sealing flange on the belt pulley side and remove sealing flange, if necessary release by applying slight blows with a rubber-headed hammer.

– Drive out the gasket ring from the removed sealing flange.

Installing

Assembly is carried out in the reverse order. When installing, observe the following:

WARNING

Wear protective gloves and goggles when working with gasket remover and degreasing agent!

– Remove residual sealant from the sealing surfaces on sealing flange, cylinder block and on the oil pan with chemical sealant remover.

– Degrease the sealing surfaces.

Note

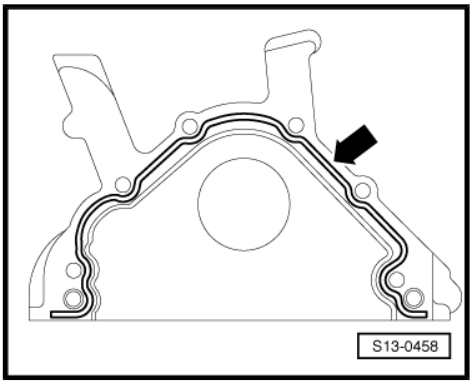
Pay attention to the use by date on the silicone sealant.

– Cut off nozzle tube at the front marking (∅ of nozzle approx. 3 mm).

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– Apply silicone sealant bead -arrow- to the clean sealing surface of the upper part of the sealing flange, as shown.

• Thickness of sealant bead -arrow-: 2…3 mm



Note

♦ *The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and clog the strainer in the intake manifold of the oil pump.*

♦ *The sealing flange must be installed within 5 minutes after applying the silicone sealant.*

♦ *When installing the sealing flange with the gasket ring fitted place a guide sleeve - T10053/1- on the crankshaft journal.*

– Carefully push the sealing flange onto the dowel sleeves at the cylinder block and tighten new fixing bolts by hand.

– Tighten sealing flange screws ⇒ page 62 .

– Installing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

– Install the new gasket ring for the crankshaft on the belt pulley side
⇒ “2.3 Replacing crankshaft sealing ring on the belt pulley side”, page 64 .

– Install the toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Top up with engine oil and check the oil level:

♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

♦ ⇒ Maintenance ; Booklet Yeti

2.5 Removing and installing sealing flange on gearbox side

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Special tools and workshop equipment required

♦ Assembly tool - T10134-

♦ Feeler gauge

♦ Steel straightedge

♦ Screw M6 x 35 (3x)

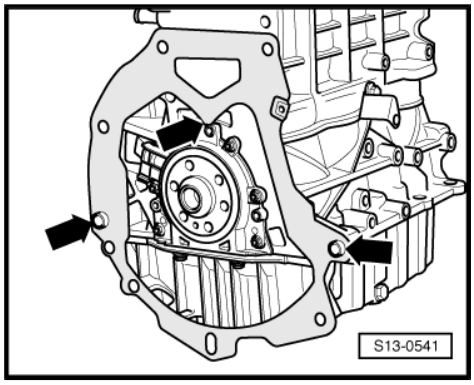
♦ Screw M7 x 35 (2x)

Removing

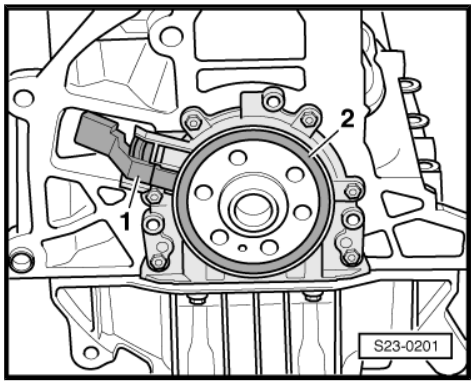
• Gearbox removed.

– Remove the two-mass flywheel
⇒ “2.6 Removing and installing flywheel”, page 74 .

– Remove the intermediate plate from the dowel sleeves and unhook from sealing flange -arrows-.
– Position crankshaft to TDC for cylinder 1
⇒ “1.7 Removing and installing toothed belt”, page 49 .
– Removing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .



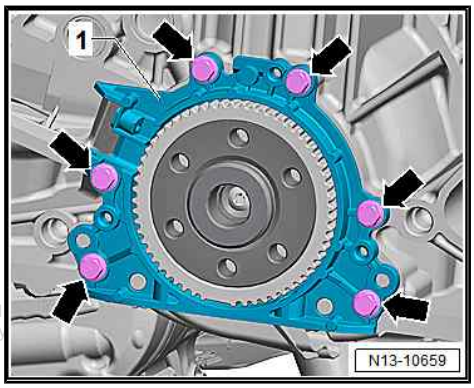
– Remove engine speed sender - G28- -1-
⇒ “1.4 Removing and installing the engine speed transmitter G28 ”, page 266 .



– Unscrew fixing screws -arrows- of the sealing flange -1-.

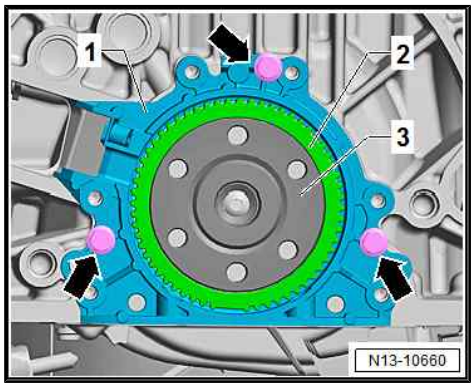
Note

Sealing flange and sender wheel are pressed together by three M6 x 35 mm screws of the cylinder block.

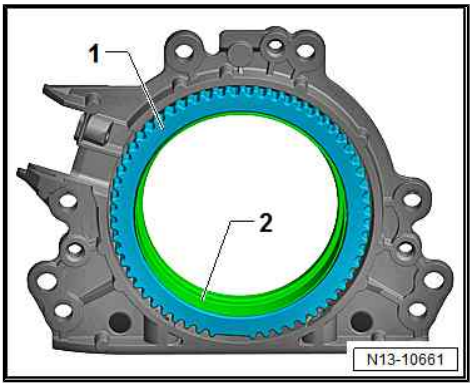


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– Alternating, screw in three screws M6x35 -arrows- (max. $^{1}/_{2}$ turn (180°) per screw) into the threaded holes of the sealing flange -1- and remove the sealing flange together with the rotor -2- from the crankshaft -3-.



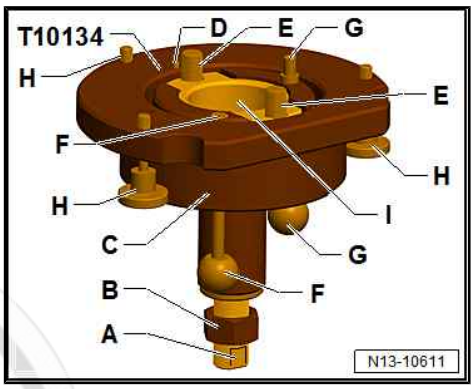
Installing



Note

- *The sealing flange with PTFE sealing ring is provided with sealing lip supporting ring -2-. This support ring serves as a fitting sleeve and must not be removed prior to installation.*
- *Do not separate or turn the sealing flange and rotor -1- after removing them from the spare part package.*
- *The rotor gets its fitting location by fixing by fixing to the positioning pin of the assembly tool - T10134- .*
- *Sealing flange and sealing ring form one unit and must only be renewed together with the transmitter wheel.*
- *The rotor has an elastomer layer on its sealing surface with the crankshaft. This layer must not be brought into contact with dirt or grease.*
- *The assembly tool - T10134- is given its fitting location to the crankshaft by means of a guide bolt, which is guided into the threaded bore of the crankshaft.*

Assembly tool - T10134-



A - Clamping surface

B - Hexagon nut

C - Assembly housing

D - Locating pin

E - Allan screws (2 pieces)

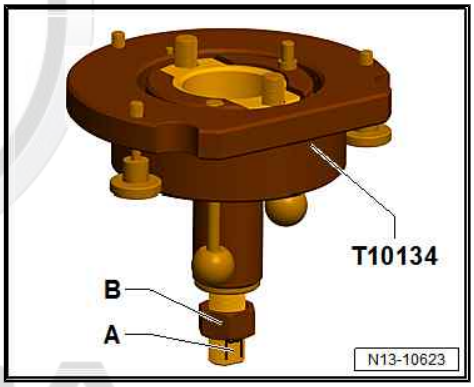
F - Guide bolts for petrol engines

G - Guide bolts for diesel engines

H - Knurled screws (3 pieces)

I - Inner part

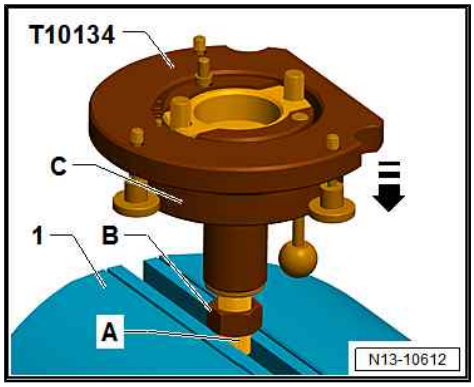
Mounting sealing ring with rotor on assembly tool - T10134-



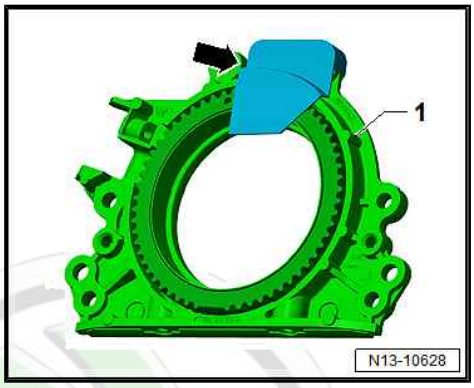
– Untwist nut -B- until just before it touches the clamping surface -A- of the threaded spindle.

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– Clamp assembly tool - T10134- on clamping surface -A- of the threaded spindle in a vice -1-.
– Press assembly housing -C- downwards in -direction of arrow- until it lies on nut -B-.
– Screw nut onto threaded spindle until inner part of assembly tool and assembly housing are at same height.



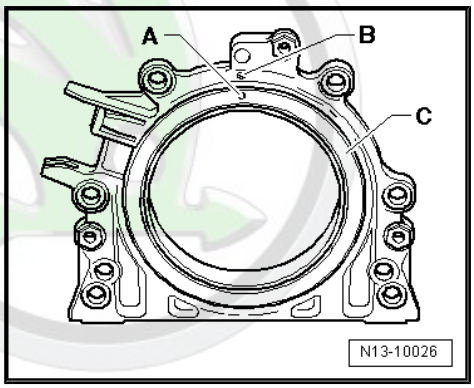
– Remove the securing clip -arrow- from the new sealing flange.



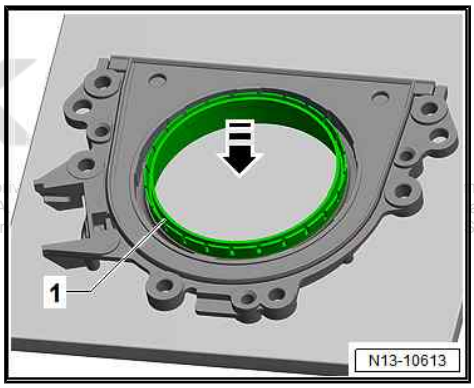
Note

Do not remove the rotor from the sealing flange or turn it.

• The locating hole -A- on the rotor -C- must be flush with the marking -B- on the sealing flange.



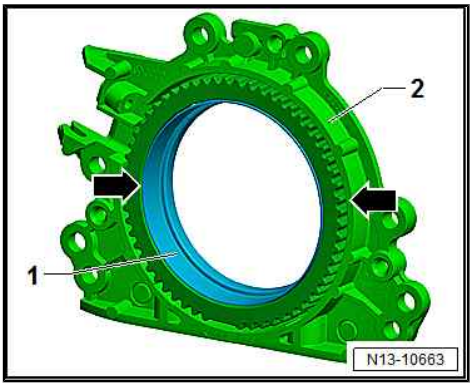
– Place sealing flange with front side facing down on a clean level surface.
– Press down sealing lip supporting ring -1- in -direction of arrow-, until it rests on the level surface.



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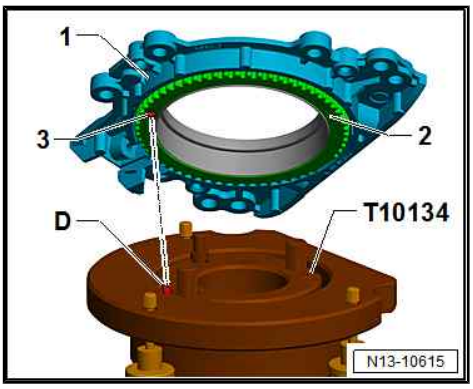
Note

The upper edge of the sealing lip supporting ring -1- and front edge of the sealing flange -2- must align -arrows-.



– Lay the sealing flange -1- with the front side on the assembly tool - T10134- so that the positioning pin -D- engages into the hole -3- of the rotor -2-.

• Sealing flange must lie straight on the assembly tool.

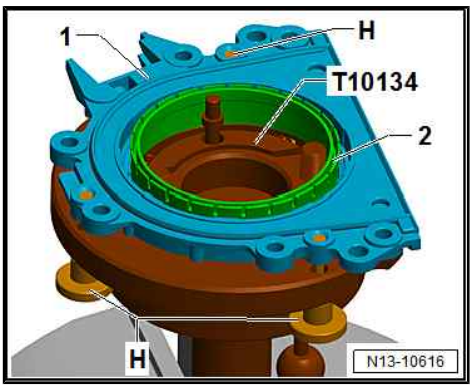


– Press on the sealing flange -1- and sealing lip supporting ring -2- by tightening the 3 knurled screws -H- onto the surface of the assembly tool - T10134- .

Note

♦ *This prevents locating pin from slipping out of sender wheel hole.*

♦ *When installing the sealing flange, ensure that the sender wheel remains fixed in the assembly device.*



Attach assembly tool - T10134- with sealing flange to the crankshaft flange and cylinder block

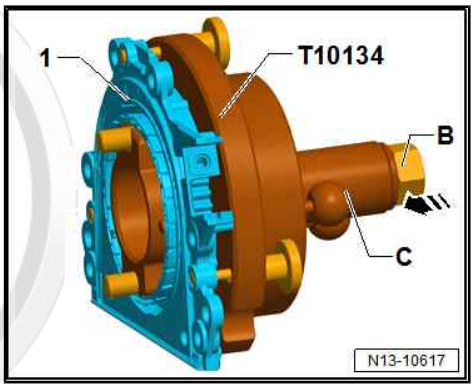
• The crankshaft flange must be free of grease and oil.

• Crankshaft is at TDC for cylinder 1.

– Screw nut -B- on until it reaches end of threaded spindle.

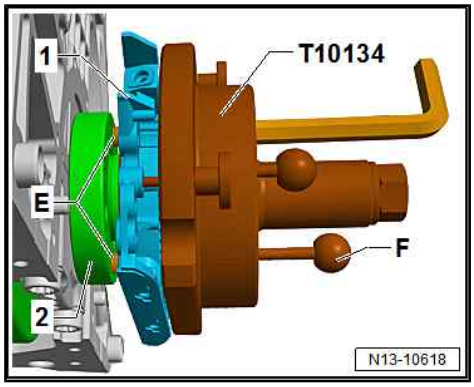
– Press the threaded spindle of the assembly tool - T10134- in -direction of arrow- until the nut -B- rests against the assembly cup -C-.

– Align flat side of assembly housing to the cylinder block sealing surface on the oil sump side.

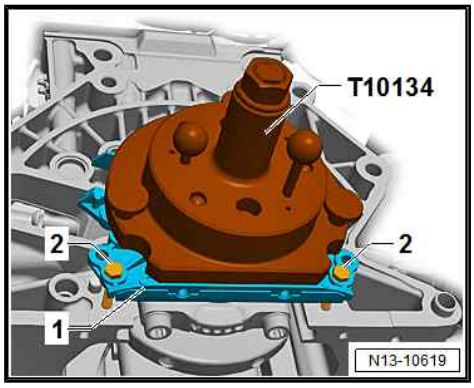


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– Secure the assembly tool - T10134- together with the sealing flange -1- with approx. five threads of the Allan screws -E- to the crankshaft flange.



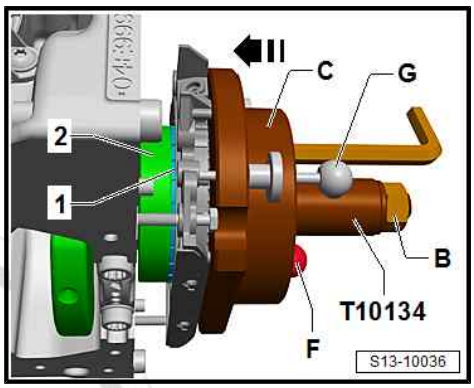
– Screw in two screws M7 x 35 mm -2- by about 3 thread turns into the cylinder block to guide the sealing flange -1-.



Secure assembly tool - T10134- to crankshaft flange

– Push the assembly cup -C- by hand in the -direction of the arrow- until the sealing lip supporting ring -1- rests on the crankshaft flange -2-.

– Push guide pin for diesel engines -G- into the hole in the crankshaft. This gives the rotor its final installation position.



Note

The guide pin for petrol engines -F- must not be inserted in threaded hole of crankshaft.

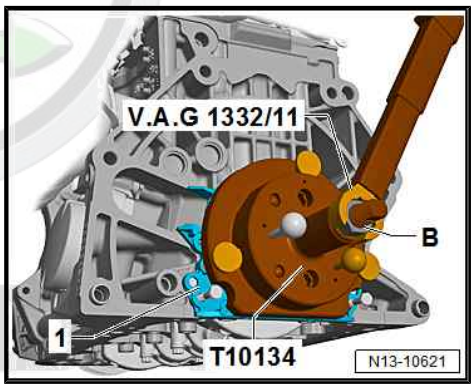
– Tighten the two Allan screws hand-tight.

– Screw nut -B- onto threaded spindle by hand until it lies against assembly housing -C-.

Press transmitter wheel onto crankshaft flange using assembly tool - T10134-

– Tighten nuts -B- on the assembly tool - T10134- with torque wrench to 35 Nm.

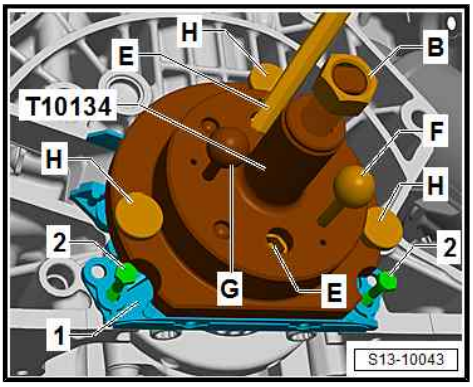
• After nut is tightened to 35 Nm, a small air gap must still be present between cylinder block and sealing flange -1-.



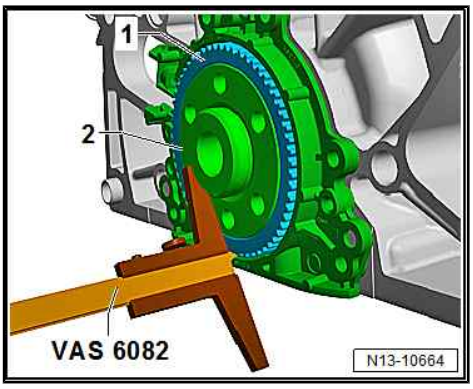
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Checking transmitter wheel installation position on crankshaft

– Screw nut -B- on until it reaches end of threaded spindle.
– Unscrew bolts-2- from the intake manifold.
– Remove knurled screws -H- from the sealing flange -1-.
– Unscrew the Allan screws -E- from the crankshaft flange.
– Remove assembly tool - T10134- .
– Remove sealing lip support ring.



– Place caliper gauge on crankshaft flange.



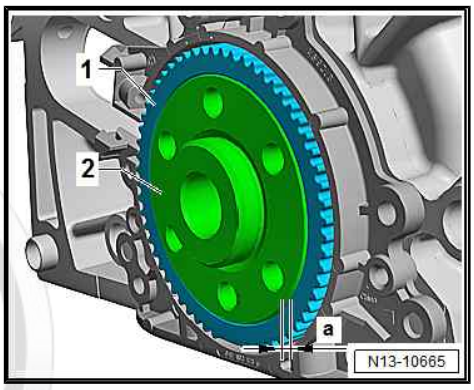
– Measure distance -a- between crankshaft flange -2- and rotor -1-.

Set value: Dimension -a- = 0.5 mm.

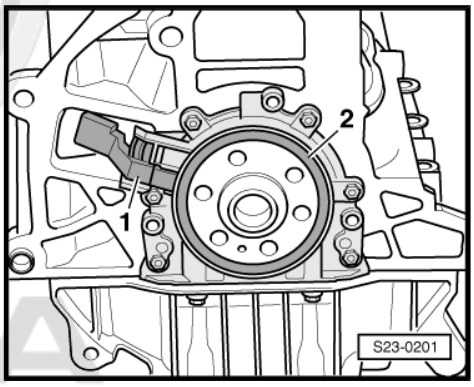
If dimension -a- is too small, press rotor down ⇒ page 74 .

If the specified value is reached:

– Tighten the new fixing screws of the sealing alternately cross-wise.



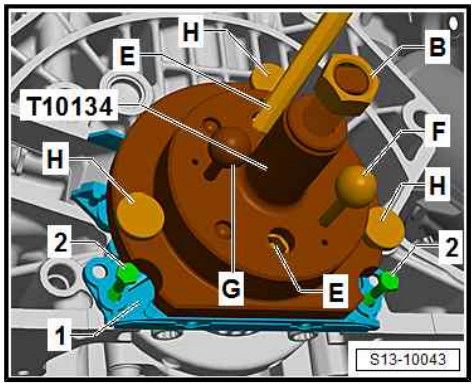
– Install engine speed sender - G28- Pos. -1-
⇒ “1.4 Removing and installing the engine speed transmitter G28 ”, page 266 .
– Installing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .
– Installing intermediate plate.
– Install flywheel with new screws.



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Re-pressing transmitter wheel

– Secure the assembly tool - T10134- and with Allan screws -E- to the crankshaft flange.



Note

Make sure the positioning pin of the assembly tool - T10134- engages in the bore of the rotor.

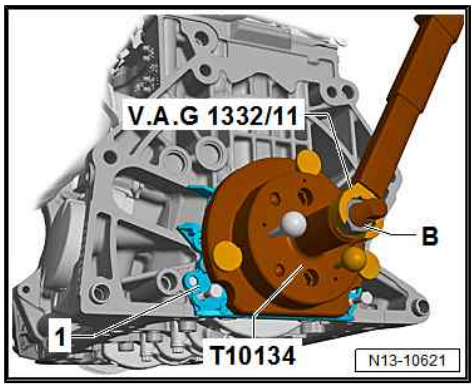
– Push guide pin for diesel engines -G- into the hole in the crankshaft up to the stop. If the guide bolt is correctly positioned, then the handle has a distance of approx. 10 mm from the assembly housing.

– Tighten the two Allan screws -E- hand-tight.

– Screw the knurled screws -H- into the flange -1-.

– Screw nut -B- onto threaded spindle by hand until it lies against the assembly housing.

– Tighten nut -B- of the assembly tool - T10134- to 40 Nm.



– Check the fitting position of the rotor on the crankshaft again ⇒ page 73 .

If the dimension -a- is too small again:

– Tighten the hexagon nut of the assembly device to 45 Nm.

– Check the fitting position of the rotor on the crankshaft again ⇒ page 73 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Screws for sealing flange on gearbox side ⇒ “2.2 Summary of components - sealing flange on the gearbox side”, page 62 .
- Screw for engine speed sender - G28- ⇒ “2.2 Summary of components - sealing flange on the gearbox side”, page 62 .
- Screws for flywheel ⇒ “2.2 Summary of components - sealing flange on the gearbox side”, page 62 .

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2.6 Removing and installing flywheel

Special tools and workshop equipment required

- Flywheel lock - MP1-223 (3067)-

or

- Engine mount - MP1-202 (VW 540)-
- Bushing - T30010 (VW 540/1B)-
- Flywheel lock - MP1-504-

Removing

- Gearbox removed.

For vehicles with a manual gearbox

– Remove the clutch ⇒ Gearbox; Rep. gr. 30 .

Continued for all vehicles

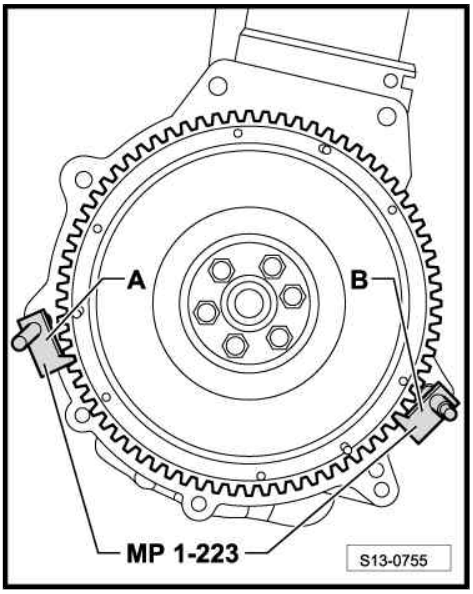
Engine installed

– Insert the counterholder - MP1-223 (3067)- into the bore hole on the cylinder block.

- Fitting position of the counterholder:

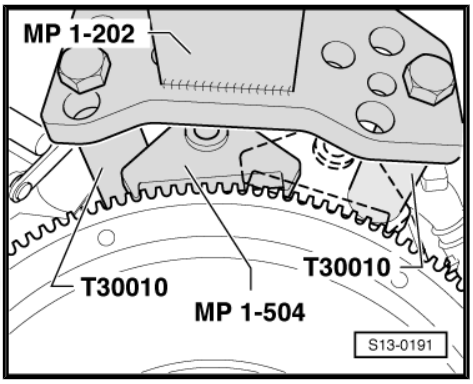
A - Position for tightening

B - Position for slackening



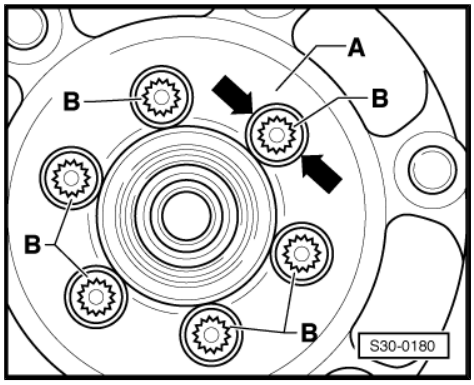
Engine removed

– Position the flywheel lock - MP1-504- on the starter ring gear of the flywheel and turn crankshaft until the lock rests against the sleeve - T30010- .



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Continue for all engines



– Rotate the secondary side -A- of the two-mass flywheel in such a way that the screws -B- are positioned in the middle of the holes -arrows-.

Caution

When unscrewing the screws -B-, ensure that no screw head catches on the secondary side -A- of the two-mass flywheel, otherwise it will be damaged.

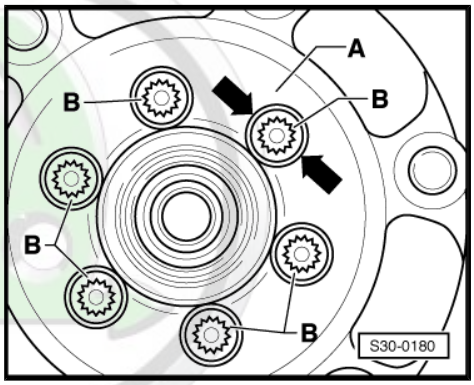
– Release screws -B- and remove two-mass flywheel.

Installing

Installation occurs in reverse order to removal. Pay attention to the following:

Note

Use new screws for attaching.



– Rotate the secondary side -A- of the two-mass flywheel in such a way that the fixing screws -B- are positioned in the middle of the holes -arrows-.

1. Screw in all the screws -B- by hand.
2. First of all tighten all the screws -B- crosswise to 60 Nm.
3. Turn all screws -B- a further 90° crosswise.

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3 Crankshaft, Piston and Conrod

⇒ “3.1 Summary of components - crankshaft (Octavia II, Yeti)”, page 77

⇒ “3.2 Summary of components - crankshaft (Superb II)”, page 78

⇒ “3.3 Assembly overview - piston and conrod”, page 80

⇒ “3.4 Replace needle bearing for crankshaft”, page 83

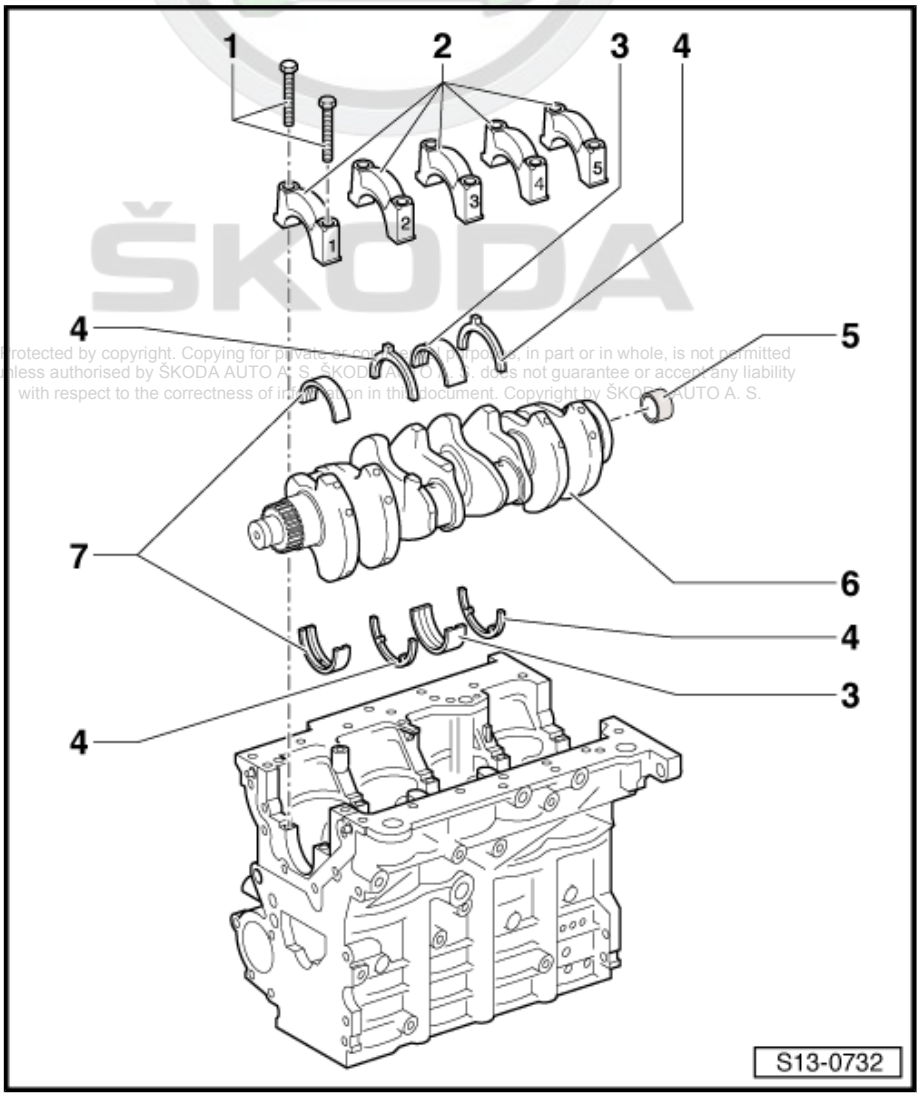
⇒ “3.5 inspect piston projection at TDC”, page 84

⇒ “3.6 Separating new connecting rod”, page 85

3.1 Summary of components - crankshaft (Octavia II, Yeti)

Note

The engine should be attached to the engine repair stand with the engine holder - MP1-202- for carrying out removal and installation work.



1 - Screw

- ❑ Replace after disassembly
- ❑ 65 Nm + 90°

2 - Bearing caps

- ❑ Bearing cap 1: belt pulley side
- ❑ Bearing cap 3: with recesses for thrust washers
- ❑ retaining lugs of the bearing shells of the cylinder block/bearing cap must be on top of one another

3 - Bearing shell 3

- ❑ for cylinder block with lubricating groove
- ❑ for bearing cap without lubricating groove
- ❑ do not mix up already used bearing shells (mark)

4 - Thrust washers

- ❑ for bearing 3
- ❑ different version for cylinder block and bearing cap
- ❑ pay attention to locating element

5 - Needle bearing

- ❑ only vehicles with automatic gearbox
- ❑ Replace ⇒ “3.4 Replace needle bearing for crankshaft”, page 83

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6 - Crankshaft

- ❑ with timing belt sprocket for oil pump drive
- ❑ Axial play when new: 0.07 - 0.17 mm

  Wear limit: 0,37 mm
- ❑ Crankshaft bearing pin: ∅ 54.00 mm
- ❑ Conrod bearing pin: ∅ 50.90 mm

7 - Bearing shells 1, 2, 4 and 5

- ❑ for cylinder block with lubricating groove
- ❑ for bearing cap without lubricating groove
- ❑ do not mix up already used bearing shells (mark)

3.2 Summary of components - crankshaft (Superb II)

Note

The engine should be attached to the engine repair stand with the engine holder - MP1-202- for carrying out removal and installation work.

1 - Bearing shell

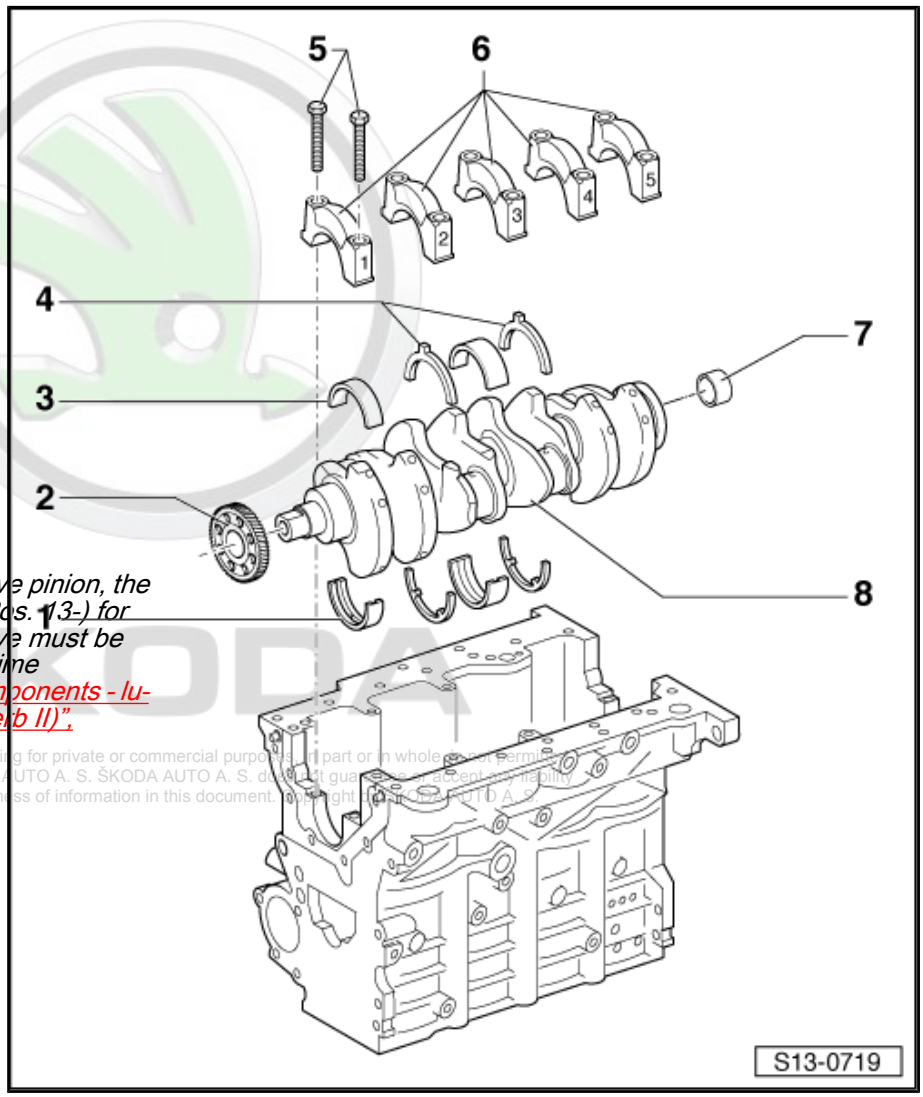
- ❑ for cylinder block with lubricating groove
- ❑ do not mix up already used bearing shells (mark)

2 - Drive pinion

- ❑ for crankshaft
- ❑ for drive of balancing shaft module and the oil pump
- ❑ Replace
  ⇒ “1.13 Replacing the crankshaft drive pinion (Superb II)”, page 149

Note

When replacing the drive pinion, the intermediate wheel (-Pos. 13-) for the balancing shaft drive must be replaced at the same time
⇒ “1.2 Summary of components - lubrication system (Superb II)”, page 128



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3 - Bearing shell

- ❑ for bearing cap without lubricating groove
- ❑ do not mix up already used bearing shells (mark)

4 - Thrust washers

- ❑ for bearing 3
- ❑ different versions for

bearing cap and cylinder block

- ❑ pay attention to locating element

5 - Screw

- ❑ Replace after disassembly
- ❑ 65 Nm + 90°

6 - Bearing caps

- ❑ Bearing cap 1: belt pulley side
- ❑ Bearing cap 3: with recesses for thrust washers
- ❑ retaining lugs of the bearing shells of the cylinder block/bearing cap must be on top of one another

7 - Needle bearing

- ❑ only vehicles with automatic gearbox
- ❑ Replace ⇒ “3.4 Replace needle bearing for crankshaft”, page 83

8 - Crankshaft

- ❑ Axial play when new: 0.07 - 0.17 mm

  Wear limit: 0,37 mm
- ❑ Crankshaft bearing pin: ∅ 54.00 mm
- ❑ Conrod bearing pin: ∅ 50.90 mm

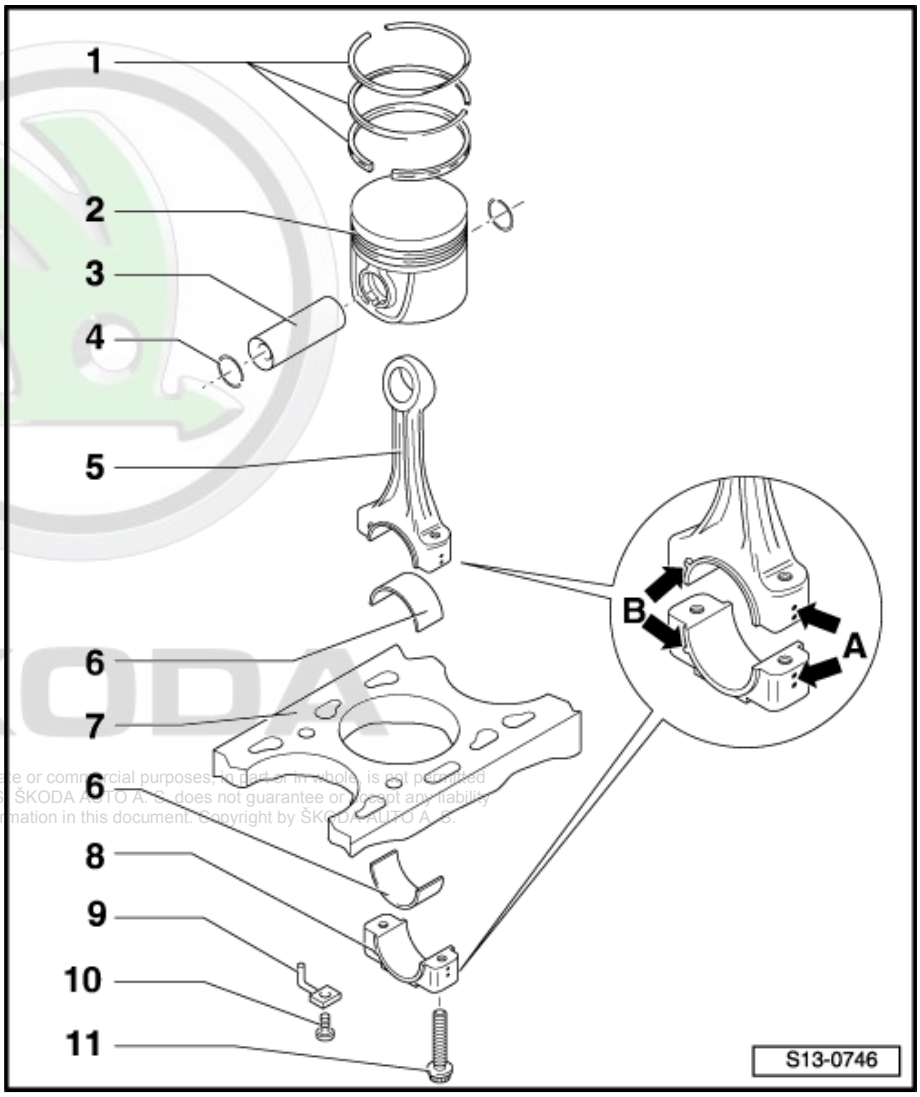
Note

When replacing the crankshaft, the intermediate wheel (-Pos. 13-) for the balancing shaft drive must be replaced at the same time *⇒ “1.2 Summary of components - lubrication system (Superb II)”, page 128* .

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3.3 Assembly overview - piston and conrod



1 - Piston rings

- ❑ Offset gaps by 120°
- ❑ use piston ring pliers for removing and installing
- ❑ marking “TOP” faces piston crown
- ❑ Check ring gap ⇒ page 81
- ❑ Check end clearance ⇒ page 82

2 - Piston

- ❑ with combustion chamber
- ❑ Mark the installation position and the assignment to cylinder
- ❑ Installation position and assignment of piston/cylinder ⇒ page 82
- ❑ arrow on the piston crown faces towards the belt pulley side
- ❑ replace piston if there is any sign of crack formation on the piston body
- ❑ Inspecting piston ⇒ page 82
- ❑ Piston dimension: ∅ 80.95 mm
- ❑ Install using piston ring tensioning strap
- ❑ inspect piston projection at TDC ⇒ “3.5 inspect piston projection at TDC”, page 84

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3 - Piston pin

- ❑ If difficult to remove, heat piston to 60 °C
- ❑ use drift - VW 222A- for removing and installing

4 - Circlip

- ❑ Replace after disassembly

5 - Connecting rod

- ❑ with a split bearing cap
- ❑ always replace as a set only
- ❑ Mark assignment to cylinder -A-
- ❑ Fitting position: markings -B- point towards the belt pulley side
- ❑ separate new conrod ⇒ “3.6 Separating new connecting rod”, page 85
- ❑ Axial clearance: Wear limit 0.37 mm

6 - Bearing shell

- ❑ Fitting position ⇒ page 83
- ❑ do not mix up already used bearing shells (mark)

- ❑ Observe version: top bearing shell (towards the piston) must be made from a long lasting material, recognition feature for new bearing shells: black marking on the contact surface near the separation point
- ❑ insert in middle ⇒ page 83
- ❑ check correct fitting

7 - Cylinder block

- ❑ Inspect cylinder ⇒ page 83
- ❑ Cylinder dimension: ∅ 81.01 mm

8 - Connecting rod bearing cap

- ❑ Check fitting position
- ❑ cracked cover fits only in one position at the relevant conrod
- ❑ separate new conrod ⇒ “3.6 Separating new connecting rod”, page 85

9 - Oil spray jet

- ❑ for piston cooling
- ❑ Removing and installing ⇒ page 83

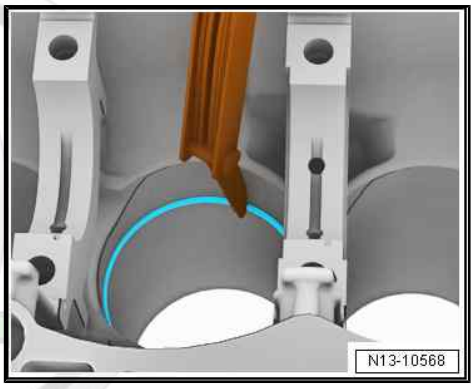
10 - Pressure valve

- ❑ replace without sealant
- ❑ Removing and installing ⇒ page 83
- ❑ 24 Nm

11 - Screw

- ❑ Replace after disassembly
- ❑ Oil threads and contact surface
- ❑ 30 Nm + 90°

Checking piston ring gap



Special tools and workshop equipment required

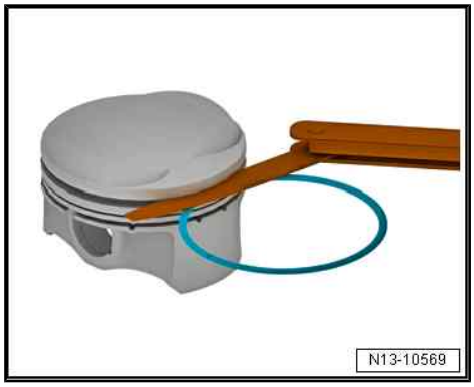
♦ Feeler gauge

– Insert ring at right angles from above down into lower cylinder bore, about 15 mm away from edge of cylinder. To insert use piston without rings.

Piston ring (dimensions in mm)	New parts	Wear limit
1. Compression ring	0.20 … 0.40	1.00
2. Compression ring	0.20 … 0.40	1.00
Oil scraper ring	0.25 … 0.50	1.00

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Checking ring-to-groove clearance



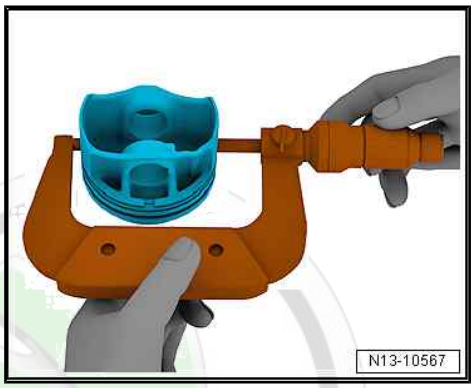
Special tools and workshop equipment required

- ♦ Feeler gauge

– Clean before inspecting the annular grooves of the piston.

Piston ring (dimensions in mm)	New parts	Wear limit
1. Compression ring	0.06 … 0.09	0.25
2. Compression ring	0.05 … 0.08	0.25
Oil scraper ring	0.03 … 0.06	0.15

Inspecting piston



Special tools and workshop equipment required

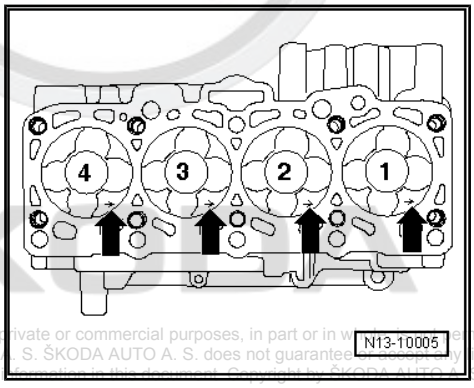
- ♦ External micrometer

– Measure about 10 mm from the lower edge, offset at right angles to the piston pin shaft.

- Max. deviation from specified dimension: 0,04 mm

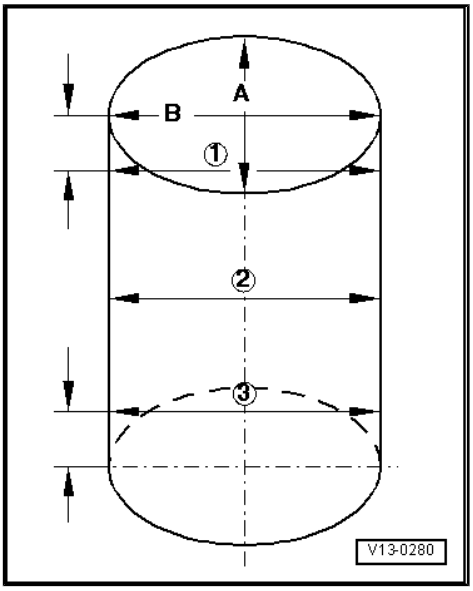
Installation position and assignment of piston/cylinder

- The arrow on the piston crown -arrows- faces towards the belt pulley side.



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Checking cylinder bores



Special tools and workshop equipment required

- ♦ Cylinder gauge

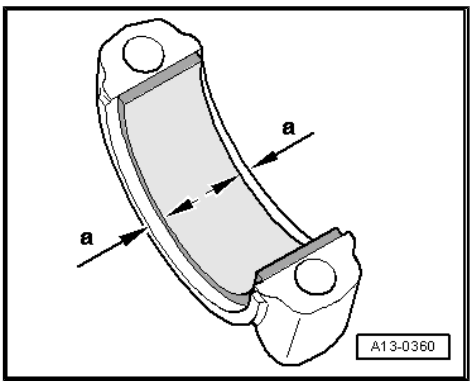
– Measure cylinder at 3 points crosswise in transverse direction -A- and lengthwise -B-.

- Max. deviation from specified dimension: 0,10 mm

Installation position of ball sockets in conrods

– Insert bearing shell in the conrod or in the centre of the conrod bearing cap.

- Dimension -a- = 2.5 mm.

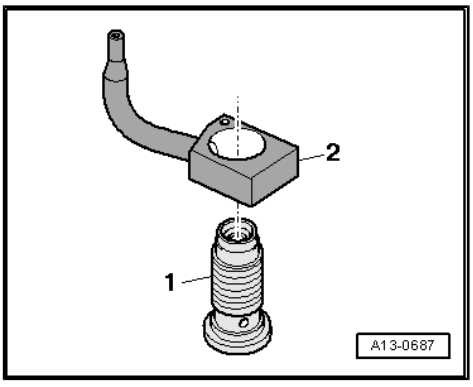


Oil spray nozzle and pressure valve

1 - Screw with pressure valve

2 - Oil spray nozzle (for cooling piston)

- Fitting position: Align the guide edge of the oil spray nozzle to the edge of the cylinder block being worked on.



Note

- ♦ *The oil injection nozzles must not be bent.*
- ♦ *Replace the oil injection nozzles if they are bent.*

3.4 Replace needle bearing for crankshaft

Only on vehicles equipped with automatic gearbox.

Special tools and workshop equipment required

- ♦ Centering mandrel - T30029 (3176)-
- ♦ Interior extractor - Kukko 21/2-
- ♦ Countersupport - Kukko 22/1-

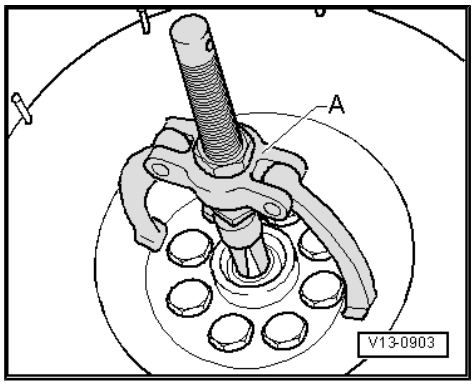
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Note

For installing an engine in a vehicle with automatic gearbox, check whether the needle bearing is built on the gearbox side in the crankshaft. Install needle bearing if necessary.

Removing

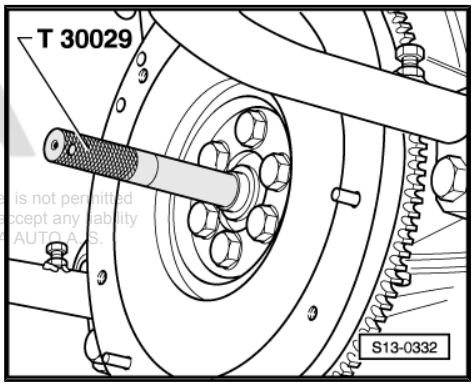
– Pull out needle bearing with interior extractor - Kukko 21/2- and countersupport - Kukko 22/1- .



Installing

• Fitting position: The marked side of the needle bearing should be legible when in its installed condition.

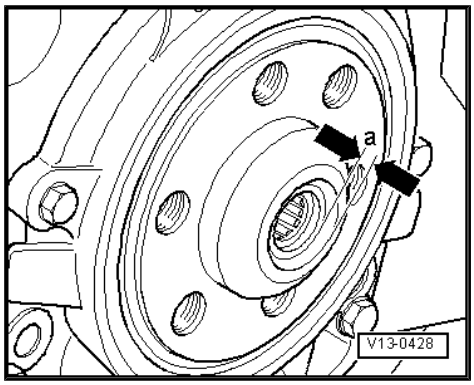
– Drive in the needle bearing using the centring pin - T30029 (3176)- .



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Depth of installation of the needle bearing.

• Dimension -a- = 1.5 up to 1.8 mm



3.5 inspect piston projection at TDC

Special tools and workshop equipment required

♦ Measuring tool for liner pretension - MP1-107-

Test sequence

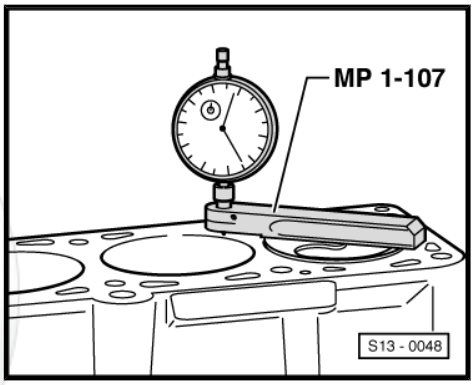
– Place the liner pretension - MP1-107- , as shown in the illustration, on the cleaned cylinder block.

– Measure the projection for each piston at 2 points crosswise opposite the cylinder block.

When fitting new pistons or a partial engine, check the piston projection in TDC on all pistons.

If different values are measured during the projection measurement of the piston, the greatest dimension applies for the seal assignment.

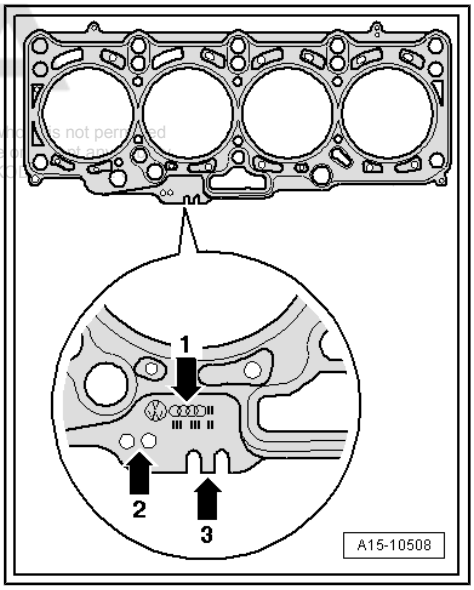
Depending on the piston projection fit the relevant cylinder head seal in accordance with the table below.



Piston projection over cylinder block top side mm	Identification Number of bores
0.91 … 1.00	1
1.01 … 1.10	2
1.11 … 1.20	3

Identification of the cylinder head gasket

- Part number arrow -1-
- Bores arrow -2-
- Notches -arrow 3- (ignore)



Note

If different values are measured during the projection measurement of the piston, the greatest dimension applies for the seal assignment.

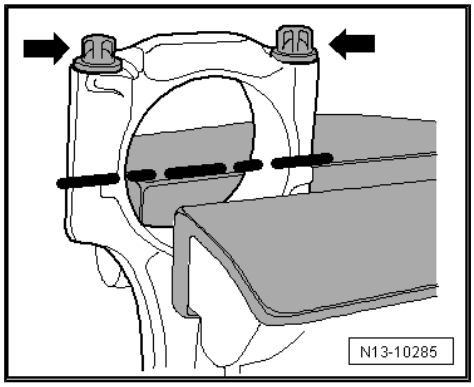
3.6 Separating new connecting rod

On new conrods it is possible that the target breaking point is not fully broken through. If the connecting rod bearing cap cannot be removed by hand, then proceed as follows:

– Mark the assignment of the connecting rod to the cylinder.

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– Slightly clamp the conrod, as shown in the illustration, in a vice with aluminium protective jaws.

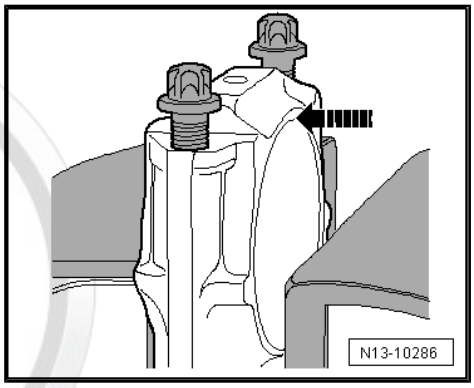


Note

- *Only tension the conrod slightly in order to avoid damage.*
- *The conrod is clamped beyond the breaking point, which is shown in the figure with a broken line.*

– Unscrew both screws -arrows- by approx. 5 turns.

– Carefully knock against the conrod bearing cap with a plastic hammer in -direction of arrow- in order to loosen it.



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15 – Cylinder head, valve gear

1 Cylinder head

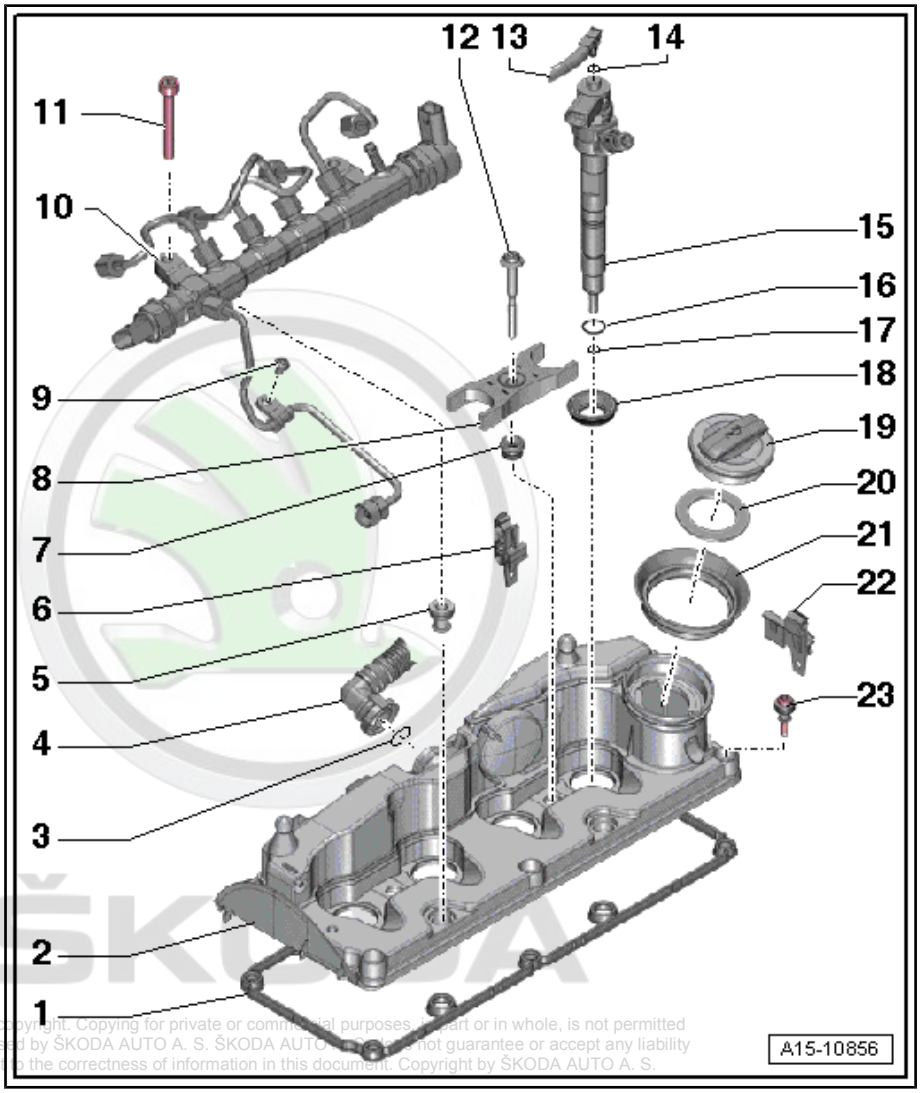
⇒ “1.1 Assembly overview - cylinder head cover”, page 87
⇒ “1.2 Summary of components - cylinder head”, page 89
⇒ “1.3 Removing and installing cylinder head cover”, page 92
⇒ “1.4 Replacing sealing rings for injection units”, page 94
⇒ “1.5 Removing and installing cylinder head”, page 95
⇒ “1.6 Removing and installing Hall sender G40 ”, page 103
⇒ “1.7 Removing and installing the vacuum pump”, page 104
⇒ “1.8 Checking compression”, page 105

1.1 Assembly overview - cylinder head cover

Caution

When installing a new stripped engine and after fitting the high pressure lines, it is absolutely necessary to tighten the screws -position 12- for the clamping claws of the injection units to the specified tightening torque ⇒ page 88 . In order to align the injection units when fitting the high pressure lines, the clamping claws of the stripped engine are only tightened in series »by hand«. If the screws of the clamping claws are not tightened to the specified tightening torque, the engine may be damaged.

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1 - Seal

- ❑ replace if damaged or leaking

2 - Cylinder head cover

- ❑ Removing and installing ⇒ “1.3 Removing and installing cylinder head cover”, page 92

3 - O-ring

- ❑ Replace after disassembly

4 - Hose

- ❑ for crankcase ventilation
- ❑ to remove, press release buttons

5 - Sealing bush

- ❑ for fixing screw of fuel distributor
- ❑ replace if damaged or leaking

6 - Mounting bracket

- ❑ for electrical cables

7 - Grommet

8 - Clamping claw

- ❑ together with 2 injection units

9 - Screw

- ❑ 8 Nm

10 - Fuel distributor

- ❑ Observe rules for cleanliness ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6
- ❑ Do not change the bending form of the high pressure pipes
- ❑ Install high pressure lines ⇒ “2.11 Installing the high pressure lines”, page 289

11 - Screw

- ❑ 22 Nm

12 - Screw

- ❑ Replace after disassembly
- ❑ 8 Nm + 270°

13 - Fuel return-flow line

14 - O-ring

- ❑ Replace after disassembly

15 - Injection unit

- ❑ Observe rules for cleanliness ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6
- ❑ Removing and installing ⇒ “2.10 Removing and installing the injection units”, page 284

16 - O-ring

- ❑ Replace after disassembly

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17 - Heat-protection seal

- ❑ Replace after disassembly

18 - Sealing ring

- ❑ for injection unit
- ❑ Replace ⇒ “1.4 Replacing sealing rings for injection units”, page 94

19 - Screw cap

20 - Seal

- ❑ for cap

21 - Grommet

22 - Mounting bracket

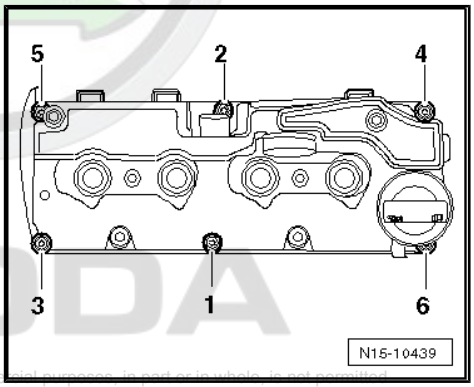
- ❑ for electrical cables

23 - Screw

- ❑ replace if the gasket has been damaged
- ❑ tightening order and tightening torque ⇒ page 89

Cylinder head cover - tightening torque and tightening order

– Tighten the screws for the cylinder head cover in the sequence -1…6- to 9 Nm.



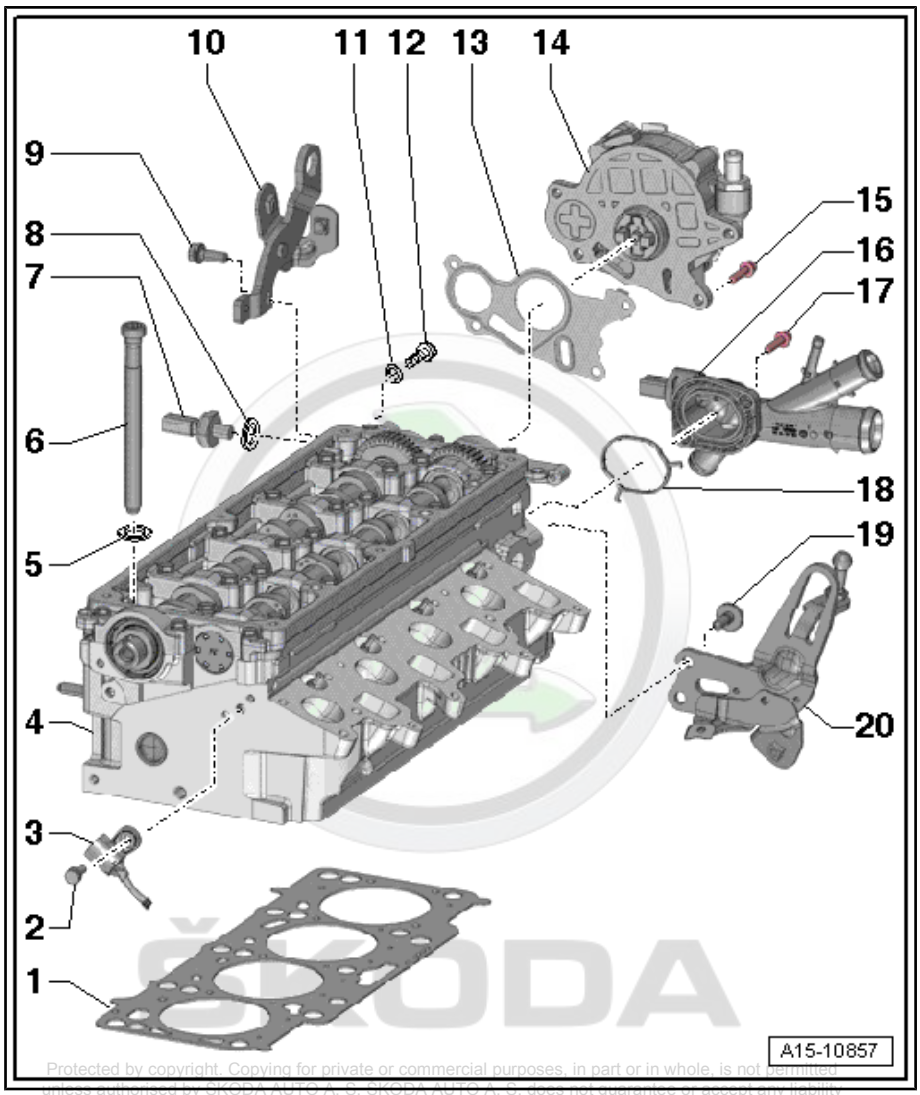
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1.2 Summary of components - cylinder head

Note

- *Cylinder heads with cracks between the valve seats may continue to be used without any reduction in the life time provided the cracks are slight and max. 0.5 mm wide.*
- *It is not permissible to rework the cylinder heads of diesel engines.*
- *Replace O-rings and gaskets.*
- *Replace cylinder head bolts and screws which have been tightened to a torquing angle.*
- *When installing an exchange cylinder head with the camshafts installed, it is necessary to oil the contact surfaces between the roller arms and the cams after installing the head.*
- *Do not remove the plastic bases supplied as a protection for the open valves until just before fitting on the cylinder head.*
- *When replacing the cylinder head, replace all the coolant ⇒ “1.3 Draining and filling coolant”, page 160 .*
- *Change contaminated engine oil:*
- ⇒ Maintenance ; Booklet Octavia II .

- ⇒ Maintenance ; Booklet Superb II .
- ⇒ Maintenance ; Booklet Yeti .



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1 - Cylinder head gasket

- ❑ Replace after disassembly
- ❑ Pay attention to the marking ⇒ page 92
- ❑ After replacing, replace all coolant ⇒ “1.3 Draining and filling coolant”, page 160

2 - Screw

- ❑ insert using locking agent ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ 10 Nm

3 - Hall transmitter - G40-

- ❑ for camshaft position
- ❑ Removing and installing ⇒ “1.6 Removing and installing Hall sender G40 ”, page 103

4 - Cylinder head

- ❑ Removing and installing ⇒ “1.5 Removing and installing cylinder head”, page 95
- ❑ only place the removed cylinder head on a foam underlay, otherwise the glow plugs can be damaged
- ❑ check for distortion ⇒ page 92
- ❑ must not be reworked
- ❑ before installing, check whether both dowel sleeves for centering the cylinder head at the cylinder block are present
- ❑ After replacing, replace all coolant ⇒ “1.3 Draining and filling coolant”, page 160

5 - Surface

- ❑ for cylinder head bolt Pos. -6-

6 - Cylinder head bolt

- ❑ Replace after disassembly
- ❑ Pay attention to sequence for loosening and tightening ⇒ “1.5 Removing and installing cylinder head”, page 95
- ❑ before fitting, insert washers -Pos. 5- into the cylinder head

7 - Oil pressure switch - F1-

- ❑ Marking: green
- ❑ Switching pressure: 0.03 - 0.06 MPa (0.3 - 0.6 bar)
- ❑ Cut open sealing ring if leaking and replace
- ❑ Removing and installing ⇒ “1.14 Removing and installing oil pressure switch F1 ”, page 151
- ❑ Check ⇒ “1.15 Testing oil pressure switch F1 and oil pressure”, page 152 .
- ❑ 20 Nm

8 - Sealing ring

- ❑ Replace after disassembly

9 - Screw

- ❑ 20 Nm

10 - Shackle

- ❑ at rear left of cylinder head

11 - Sealing ring

- ❑ Replace after disassembly

12 - Screw plug

- ❑ for oil duct
- ❑ 14 Nm

13 - Seal

- ❑ Replace after disassembly

14 - Vacuum pump

> **WARNING**
> *The vacuum pump must on no account be disassembled, otherwise the proper operation of the pump vacuum part is no longer assured. This will result in a failure of the brake booster.*

- ❑ Removing and installing ⇒ “1.7 Removing and installing the vacuum pump”, page 104

15 - Screw

- ❑ 10 Nm

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16 - Connection fitting

- ❑ for coolant with coolant temperature sender - G62-
- ❑ Replace coolant temperature sender - G62-
  ⇒ “1.5 Replace coolant temperature sender G62 ”, page 164

17 - Screw

- ❑ 9 Nm

18 - Seal

- ❑ Replace after disassembly

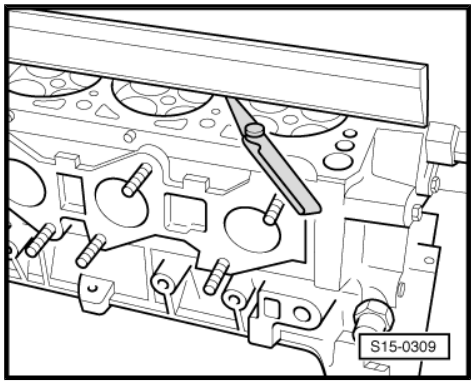
19 - Screw

- ❑ 20 Nm

20 - Shackle

- ❑ at front left of cylinder head

Checking cylinder head for distortion



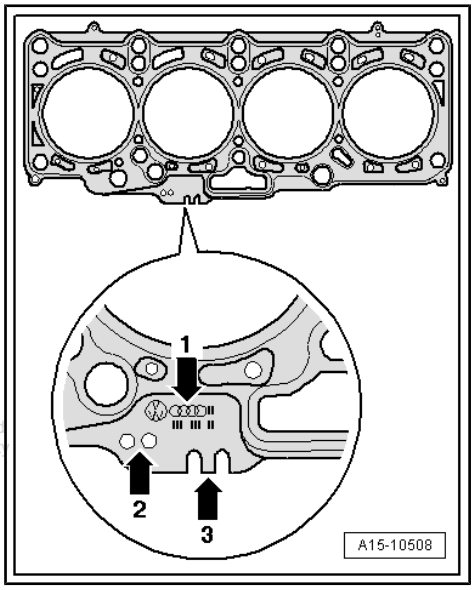
– Inspect cylinder head at several points for distortion using a knife-edge straightedge and feeler gauge.

• Max. permissible distortion: 0.1 mm

Note

It is not permissible to rework the cylinder heads of diesel engines.

Identification of the cylinder head gasket



- Part number = arrow -1-
- Bores arrow -2-
- Arrow -3- (ignore)

Note

- *Differing thicknesses of cylinder head gaskets are inserted according to the piston projection. If only the gasket is replaced, it must be replaced with a new gasket with the same marking.*
- *When fitting new pistons or a partial engine, check the piston projection in TDC on all pistons*
  ⇒ *“3.5 inspect piston projection at TDC”, page 84* .

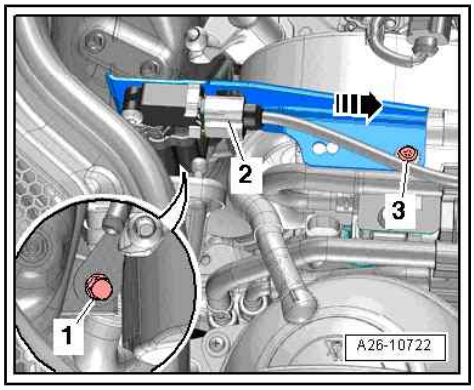
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1.3 Removing and installing cylinder head cover

Removing

– Remove engine cover
  ⇒ “1.1 Removing and installing engine trim panel”, page 11 .

Engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA



– Disconnect plug -2- at differential pressure indicator - G505- .

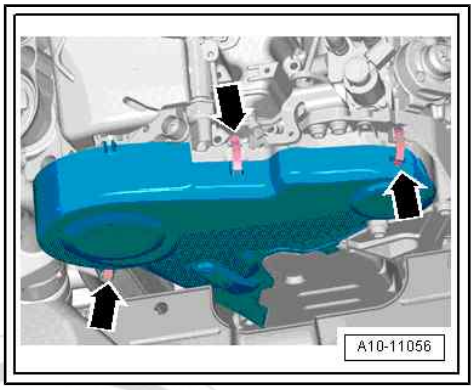
– Screw out screw -3- and detach bracket with differential pressure sender - G505- in -direction of arrow- from the bracket for additional fuel pump and place to the side.

Continue for all engines

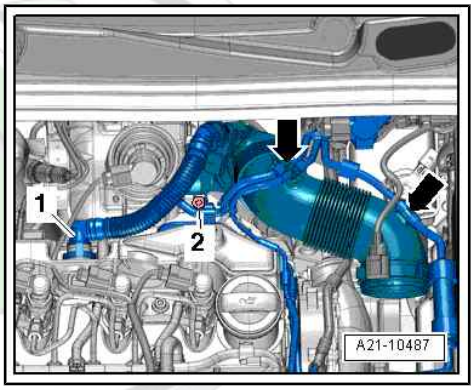
– Release the clamps -arrows- and press the toothed belt guard - top part to the right side.

– Remove the injection units
⇒ “2.10 Removing and installing the injection units”, page 284 .

– Remove fuel distributor
⇒ “2.12 Removing and installing the fuel distributor”, page 291 .

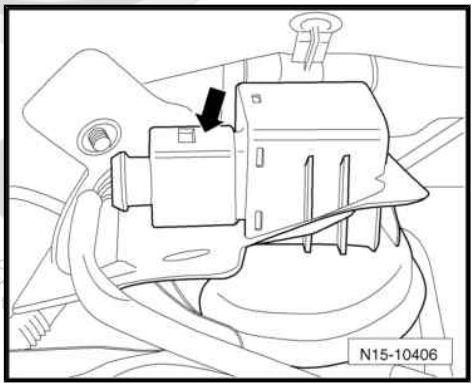


– Remove the hose -1- for the crankcase ventilation from the cylinder head cover, to do so press the release buttons.



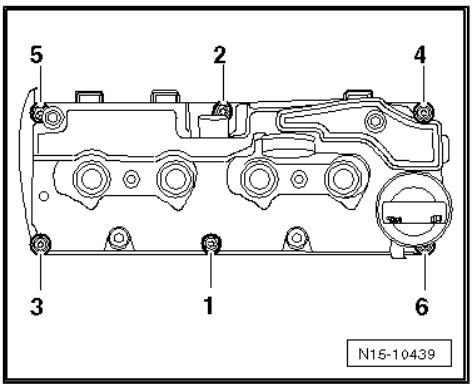
– Disconnect the plug -arrow- on the position sender for charge pressure regulator - G581- .

– Remove the vacuum lines from the bracket at the cylinder head cover.

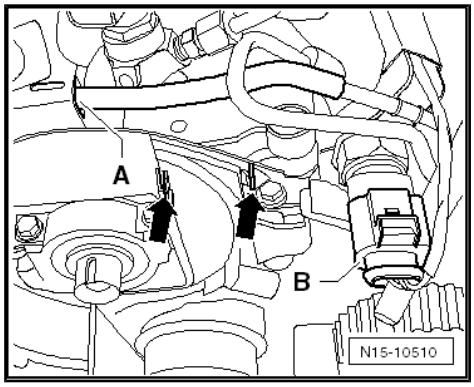


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– Slacken the screws for the cylinder head cover in the sequence -6 … 1- and release them.



– Unclip the cylinder head cover at the catch pegs -arrows- of the rear toothed belt guard and remove it from the cylinder head.



Installing

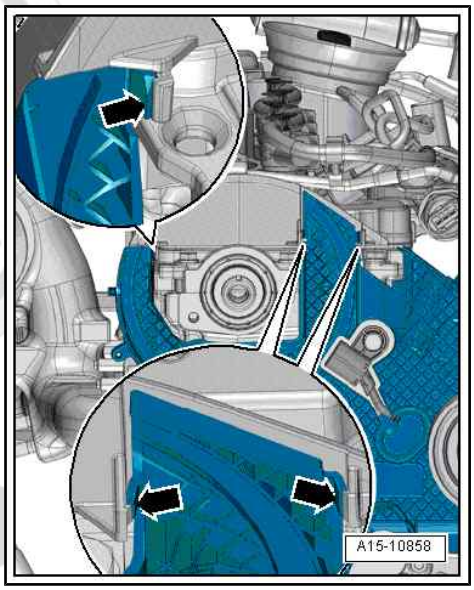
Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Replace gasket and screws for cylinder head cover if damaged or leaking.*
- *Replace grommets and gaskets for injection units if damaged or leaking.*

– Tighten cylinder head cover screws ⇒ page 89 .

– Make sure that the cylinder head cover is correctly clipped with the rear toothed belt guard -arrows-.



Note

To provide a clearer illustration, the fitting position is shown with the hub removed and the toothed belt sprocket removed at the camshaft.

– Check the clearance between the hub and the rear toothed belt guard.

– Install coolant return-flow line.

– Install the injection units ⇒ “2.10 Removing and installing the injection units”, page 284 .

– Install fuel distributor ⇒ “2.12 Removing and installing the fuel distributor”, page 291 .

Engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

– Install differential pressure indicator - G505- .

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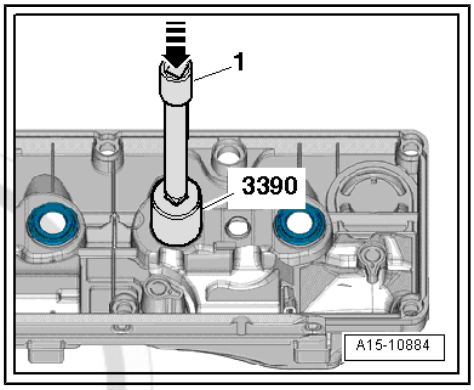
1.4 Replacing sealing rings for injection units

Special tools and workshop equipment required

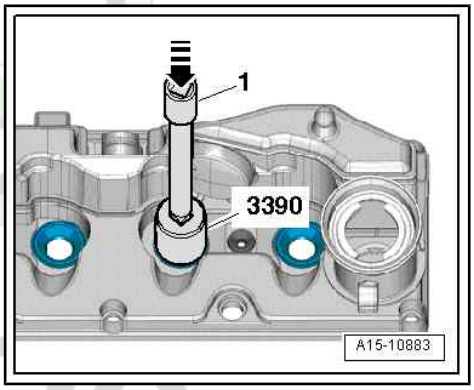
- Driver - 3390-

– Remove cylinder head cover ⇒ “1.3 Removing and installing cylinder head cover”, page 92 .

– Press out the old gasket ring for the injection unit using the driver - 3390- and a short extension -1- from the inside of the cover outwards.



– Press in the new gasket ring for the injection unit using the driver - 3390- and a short extension -1- from the outside of the cover up to the stop.



– Install cylinder head cover
⇒ “1.3 Removing and installing cylinder head cover”, page 92 .

1.5 Removing and installing cylinder head

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Special tools and workshop equipment required

- Guide bolt - MP1-208 (3070)-
- Rig pin for the injection pump - 3359- or -MP1-301- (2x)
- Crankshaft arrester - T10050-
- Counterholder - T10051-
- Extractor - T10052-
- Key - T10461-
- Catch pan , e.g. -VAS 6208-
- Sealant remover Gasket Stripper (stock code GST, stock item No. R 34402), manufacturer Retech s.r.o.
- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves
- Locking agent - D 000 600 A2-

Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- *To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.*

Observe all safety measures and notes for assembly work on the fuel supply and injection system, at the charge air system and also observe the rules for cleanliness
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 ,
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

Removing

Conditions

- Engine temperature should not exceed 35°C, because the cylinder head could be twisted when slackening the screws.
- The pistons must not be in TDC.

– Remove air filter with air mass meter - G70- and inlet hose
⇒ “3.6 Removing and installing air filter”, page 309 .

– Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .

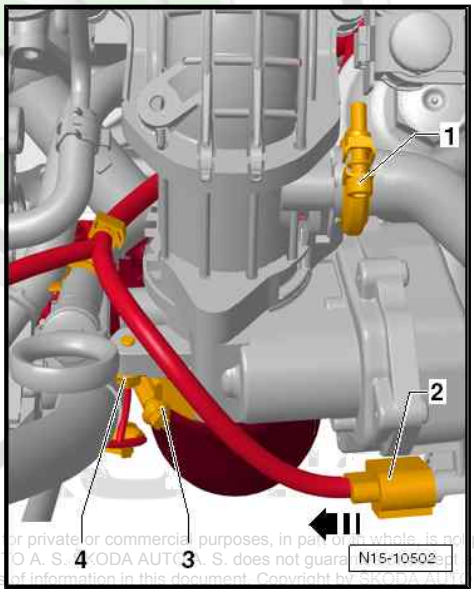
– Remove fan shroud for radiator fan - V7- and -V35-
⇒ “3 Radiator and radiator fan”, page 172 .

– Remove cylinder head cover
⇒ “1.3 Removing and installing cylinder head cover”, page 92 .

– Disconnect the plug -2- from the throttle valve control unit - J338- .

– Screw out the fixing screw of the oil dipstick -4-.

– Detach the vacuum line from the vacuum pump.

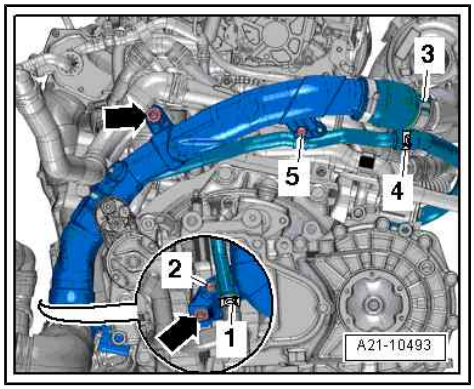


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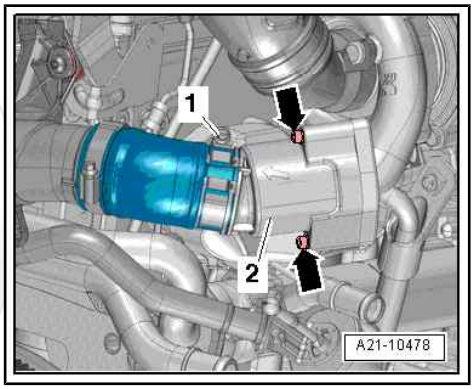
– Unscrew screws -2-, -5- and -arrows-.

– Expose electrical cables and hoses on the left charge air pipe.

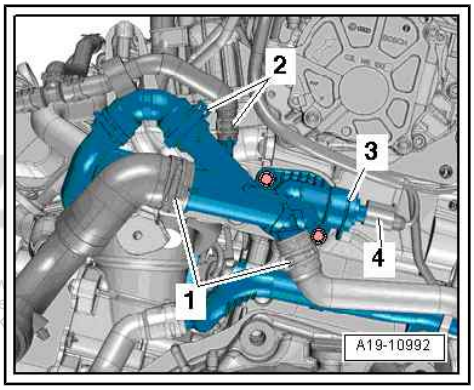
– Release hose clamp -3- and remove left charge air pipe.



– Screw out screws -arrows- and remove pulsation dampener -2-.
– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

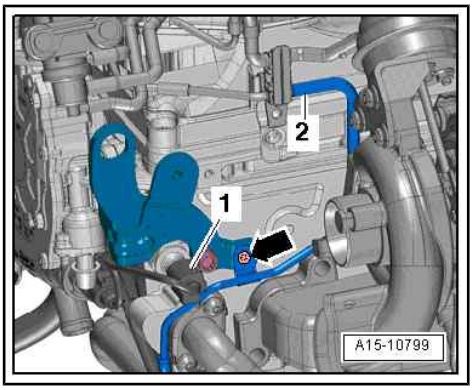


– Disconnect plug -4- at the coolant temperature sender - G62- .
– Remove the coolant hoses from the connection fitting, to do so slacken the hose clamps -1- and -2-

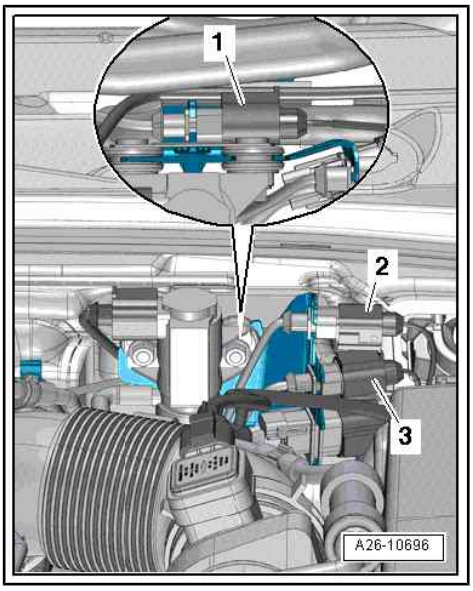


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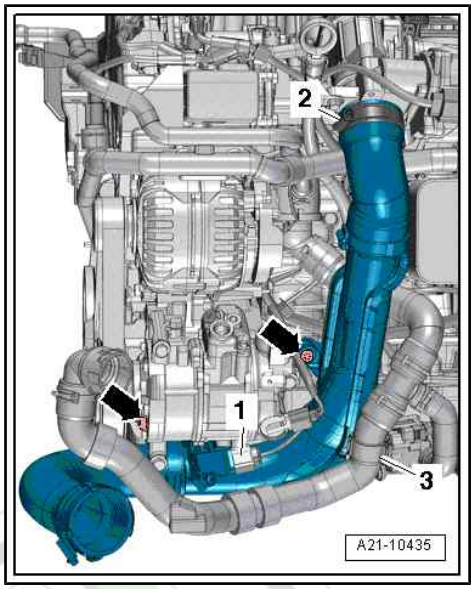
– Disconnect plug -1- at oil pressure switch - F1- .
– Unscrew screw -arrow-.
– Disconnect vacuum hose -2-.



– Take plug connections -3- out of the holder and disconnect.
– Expose electrical cables at exhaust gas turbocharger.



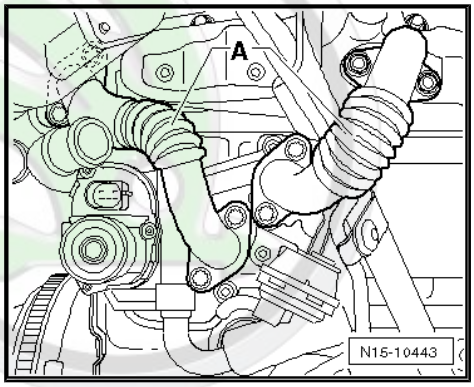
– Remove screws -arrows-.
– Detach coolant hose -3-.
– Loosen hose clamp -2-.
– Disconnect the plug -1- at the charge pressure sender - G31- / intake air temperature sender - G42- and remove the right charge air pipe.



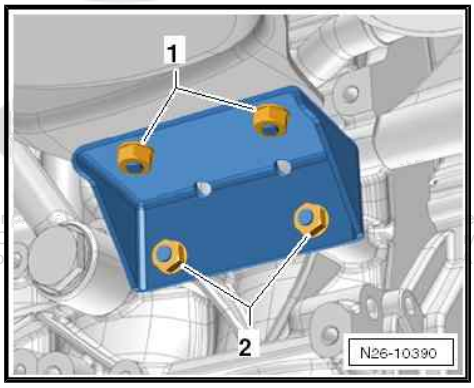
Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

– Remove connection pipes for exhaust gas recirculation -A-.



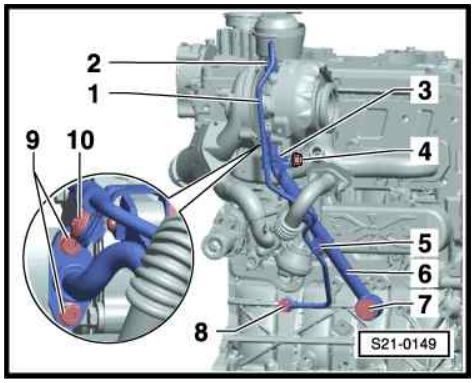
– Unscrew the nuts -2- of the bracket for the pre-exhaust pipe at the cylinder block.



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Engines with identification characters CFFB, CFHA, CFHC, CFHF, CLCA, CLCB, CLJA

– Unscrew the union nut -2- of the oil feed line -1-. At the same time counterhold the hexagon of the connection fitting using the key - T10461- .
– Bend oil feed line -1- from the exhaust gas turbocharger.
– Release screw -4- and remove bracket -3-.



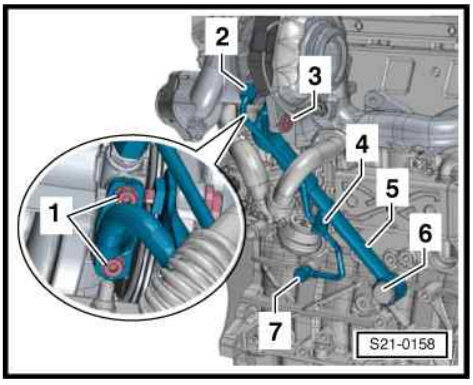
Engines with identification characters CFGB, CFJA

– Unscrew screw -4- for clamping the oil feed line.

– Unscrew union nut -2-. At the same time counterhold the hexagon of the connection fitting using the key - T10461- .

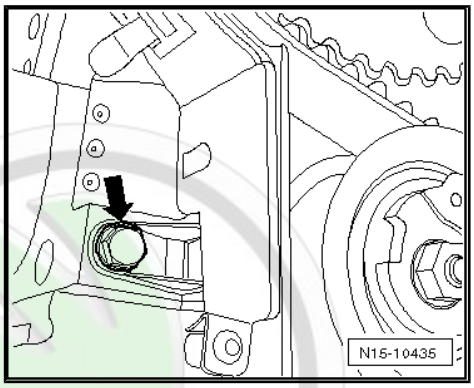
– Bend the oil feed line from the exhaust turbocharger.

– Release the fixing screw -3- of the support for exhaust gas turbocharger.

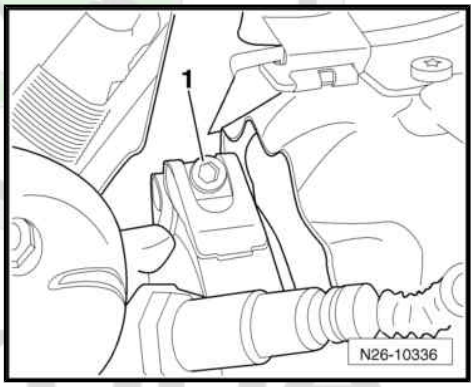


Continue for all engines

– Unscrew the screw -arrow- on the rear timing belt guard.

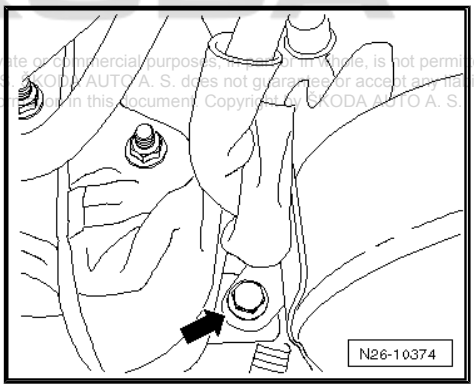


– Slacken the screw -1- of the fixing clamp between the exhaust gas turbocharger and the pre-exhaust pipe.



Engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA, CLCB, CLJA

– Release the screw -arrow- from the bracket at the cylinder head and push the pre-exhaust pipe to the side.



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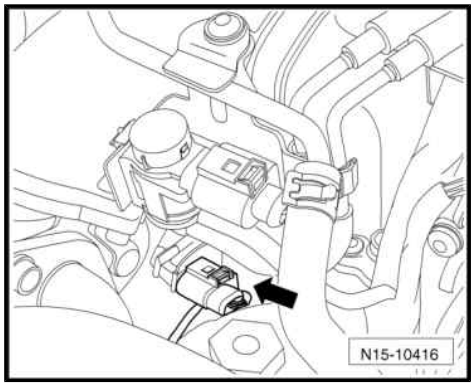
Continue for all engines

– Disconnect plug at Hall sender - G40- -arrow-.

– Remove the toothed belt from the camshaft
⇒ “1.7 Removing and installing toothed belt”, page 49 .

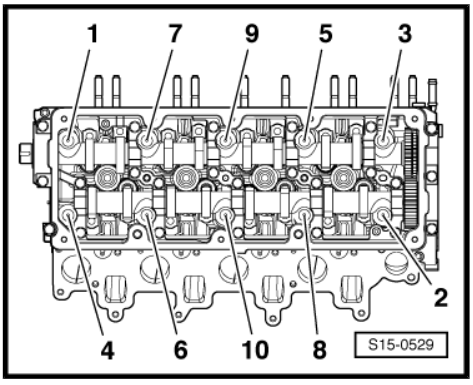
– Remove camshaft sprocket and pull off hub for camshaft with the extractor - T10052- .

– Release the fixing nut of the timing belt tensioning pulley.



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– Follow the sequence -1 … 10- for loosening the cylinder head screws.



Note

- *The assistance of a second mechanic is required for removing the cylinder head.*
- *The timing belt tensioning pulley is removed from the pin screw when lifting out the cylinder head.*
- *The oil return-flow line for the exhaust gas turbocharger is detached from the support when removing the cylinder head.*

– First of all raise the cylinder head on the gearbox side and thread it out of the rear timing belt guard. Make sure that the timing belt tensioning pulley does not fall down.

Caution

Risk of damage to the glow plugs when turning the cylinder head.

- ***If the cylinder head is removed with installed glow plugs, do not place it down on the sealing surface since the glow plugs protrude slightly beyond the sealing surface.***

– Place down the cylinder head in such a way that the oil return flow line does not bend, if necessary place a wooden wedge under the exhaust manifold.

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Installing

Note

- *There must not be any oil or coolant present in the threaded holes for the cylinder head bolts.*
- *Replace cylinder head screws, self-locking nuts and all the screws which have been tightened to a torquing angle.*
- *Always replace gasket rings and seals.*
- *Remove the new cylinder head gasket from its wrapping immediately before fitting.*
- *Treat the seal with the utmost care. Damage to the silicone layer and in the area of the seal results in leakages.*
- *When installing an exchange cylinder head with the camshafts installed, it is necessary to oil the contact surfaces between the roller arms and the cams after installing the cylinder head.*
- *Secure all hose connections with corresponding hose clips.*

WARNING

Wear protective gloves when working with sealant and grease remover!

Note

Make sure that when cleaning the cylinder head and cylinder block no foreign bodies can get into the cylinder, the oil and coolant galleries or into the threaded holes.

– Carefully remove old sealant residue from the cylinder head and cylinder block using a chemical sealant remover.

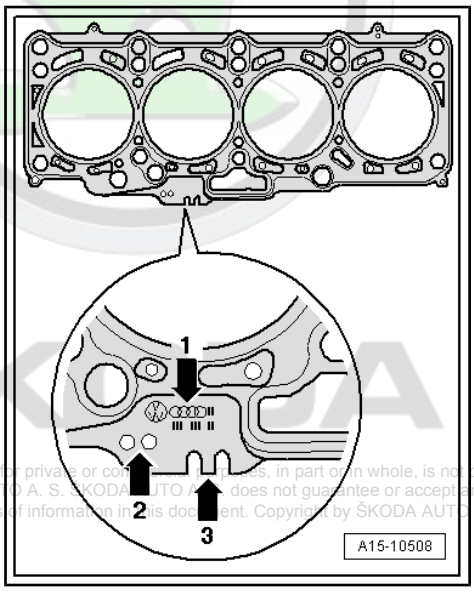
– Remove the crankshaft arrester - T10050- before placing on the cylinder head and turn the crankshaft in the opposite direction of rotation of engine until all the pistons are almost evenly positioned at the same height.

– Pay attention to the identification of the cylinder head seal.

♦ Part number = arrow -1-

♦ Bores arrow -2-

♦ Arrow -3- (ignore)



Note

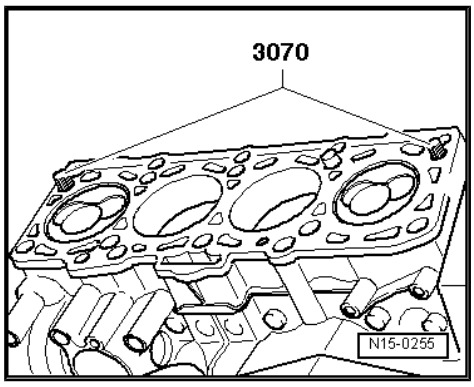
♦ *Install a new cylinder head gasket with the same marking, irrespective of whether or not the cylinder head was replaced.*

♦ *If parts of the crankshaft drive have been replaced, then the new cylinder head gasket must be determined by measuring the piston projection at TDC*
⇒ "3.5 inspect piston projection at TDC", page 84 .

– Position the cylinder head gasket with the marking to the top.

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– For centering, screw in guide bolts - MP1-208 (3070)- into the outer holes on the suction side.



Note

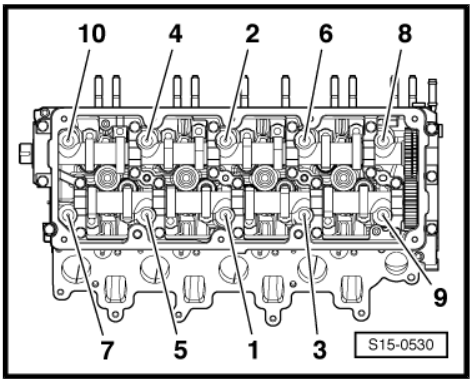
The tensioning pulley for timing belt must be fitted onto the pin screws when placing on the cylinder head.

– Fit cylinder head, insert 8 cylinder head bolts and tighten hand-tight.

– Screw the guide bolts out of the screw holes with a bolt tightener from -MP1-208 (3070)- and screw in the 2 remaining cylinder head screws.

– Tighten cylinder head screws in the order -1...10- in 4 stages as follows:

Step	Procedure
I	– Pre-tighten with the torque wrench to 30 Nm.
II	– Pre-tighten with the torque wrench to 50 Nm.
III	– Tighten further 90° with a rigid wrench.
IV	– Tighten further 90° with a rigid wrench.



Note

Tightening up the cylinder head bolts after doing repair work is not necessary.

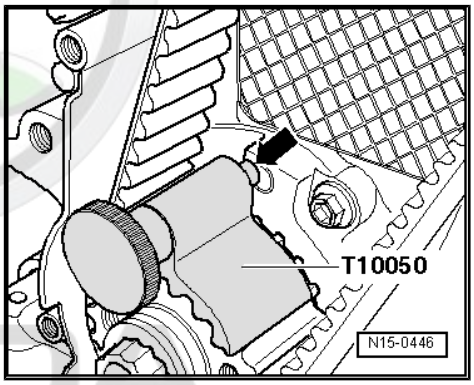
Installation is carried out in the reverse order. When installing, note the following:

– Attach rear toothed belt guard to cylinder head.

– Install the hub and the camshaft sprocket.

– Lock the camshaft and the high pressure pump with the rig pins for injection pump - 3359- .

– Rotate the crankshaft to TDC in direction of rotation of the engine and interlock with the crankshaft arrester - T10050- .



– Fit on the toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Install cylinder head cover
⇒ “1.3 Removing and installing cylinder head cover”, page 92 .

Note

If the cylinder head was replaced, refill the entire system with coolant.

– Top up coolant
⇒ “1.3 Draining and filling coolant”, page 160 .

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– Filling and bleeding the fuel system. For this purpose, connect the vehicle diagnosis, measurement and information system - VAS- and carry out the targeted function “bleeding the fuel system”. During this function, the fuel pump is actuated for 180 seconds.

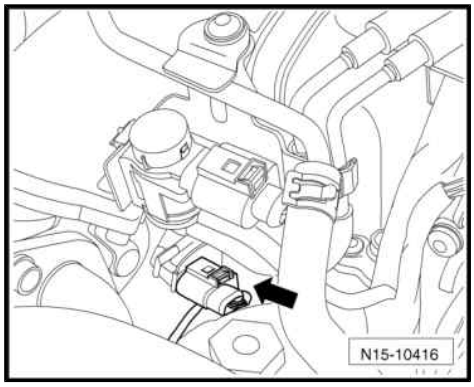
– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

– Perform a test drive, query and erase fault memory of engine control unit ⇒ Vehicle diagnostic tester.

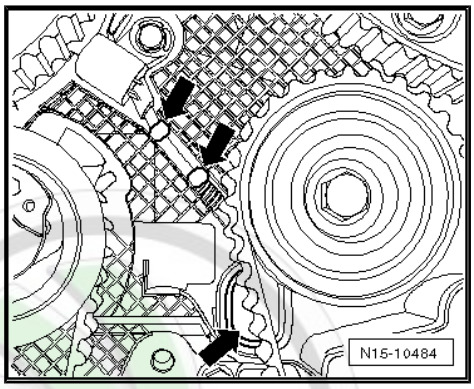
1.6 Removing and installing Hall sender - G40-

– Remove toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .

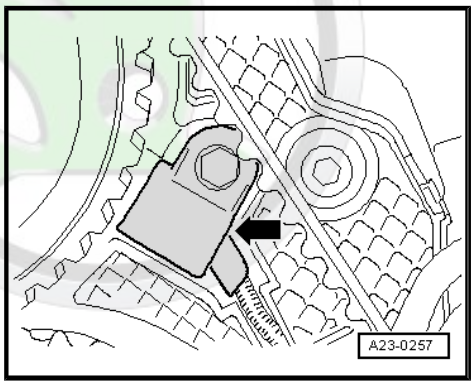
– Disconnect plug from Hall sender - G40- -arrow-.
– Disconnect the plug from its bracket.



– Remove the lands and the cover of the repair opening -arrows- using a screwdriver.



– Unscrew the Hall sender - G40- -arrow- from the cylinder head and guide its plug through the repair opening in the toothed belt guard.



Installing

Installation is carried out in the reverse order. Pay attention to the following:

- Close the repair hole in the toothed belt guard with a rubber plug ⇒ ETKA - Electronic Catalogue of Original Parts .
– install toothed belt and set the timing
⇒ “1.7 Removing and installing toothed belt”, page 49 .

1.7 Removing and installing the vacuum pump

WARNING

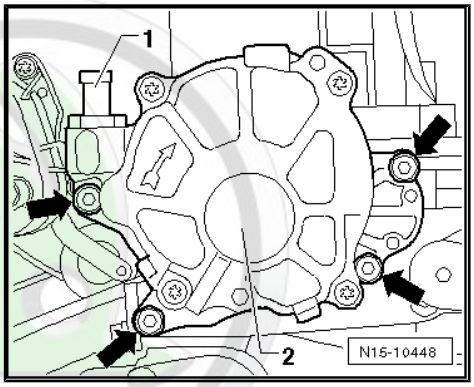
The vacuum pump must on no account be disassembled, otherwise the proper operation of the pump vacuum part is no longer assured. This will result in a failure of the brake booster.

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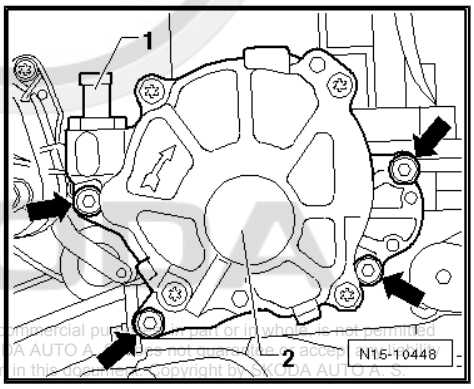
Removing

– Remove air filter
⇒ “3.6 Removing and installing air filter”, page 309 .

– Detach the vacuum line to the brake servo unit from the nozzle -1- of the vacuum pump -2-.
– Release the fixing screws of the left charge air pipe, afterwards press the left charge air pipe slightly downwards in order to reach the rear fixing screw of the vacuum pump.



– Unscrew securing bolts -arrows-.
– Remove vacuum pump -2- from cylinder head.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Pay attention to the correct position of the coupling for the vacuum pump in the camshaft.*
- *Always replace the vacuum pump seals.*

– Install vacuum pumps and tighten fixing screws to 9 Nm.
– Connect the vacuum line of the brake servo unit to the nozzle -1- of the vacuum pump.

1.8 Checking compression

Note

- *A rough test of the compression pressure can be carried out in the targeted fault finding ⇒ Vehicle diagnostic tester.*
- *The following work sequence with the compression tester gives more precise values.*

Special tools and workshop equipment required

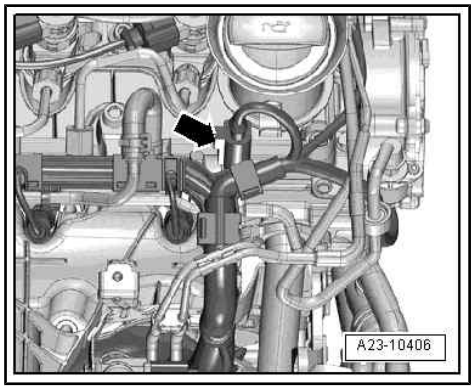
- Compression tester , e.g. -V.A.G 1763-
- Adapter , e.g. -V.A.G 1381/12-
- Hinged wrench - 3220-

Test condition

- Engine oil temperature at least 30 °C.

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– Disconnect the plug -arrow- at the fuel pressure regulating valve - N276- .
– Remove the glow plug for the relevant cylinder with the hinged wrench - 3220-
⇒ “1.1 Removing and installing glow plugs”, page 360 .
– Screw adapter - V.A.G 1381/12- into the threaded hole of the glow plug.
– Check compression pressure using the compression tester - V.A.G 1763- .



Note

Use of tester ⇒ Owner's Manual .

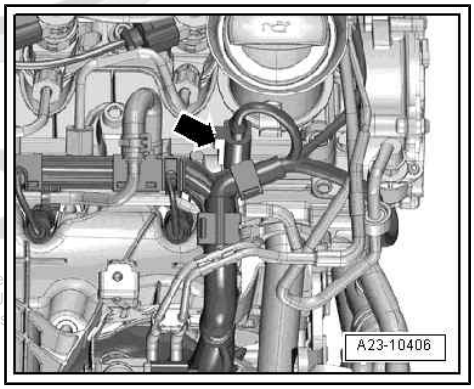
– Operate starter until the tester no longer indicates a pressure rise.

Compression readings

Engine new	Wear limit	Permissible difference between the cylinders
2.5…3.1 MPa	1.9 MPa	max. 0.5 MPa
25 … 31 bar	19 bar	max. 5 bar

After the compression pressure testing

– Re-install the glow plug of the relevant cylinder
⇒ “1.1 Removing and installing glow plugs”, page 360 .
– Connect the plug -arrow- to the fuel pressure regulating valve - N276- .
– Querying and erasing event memory of engine control unit ⇒ Vehicle diagnostic tester.



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2 Valve gear

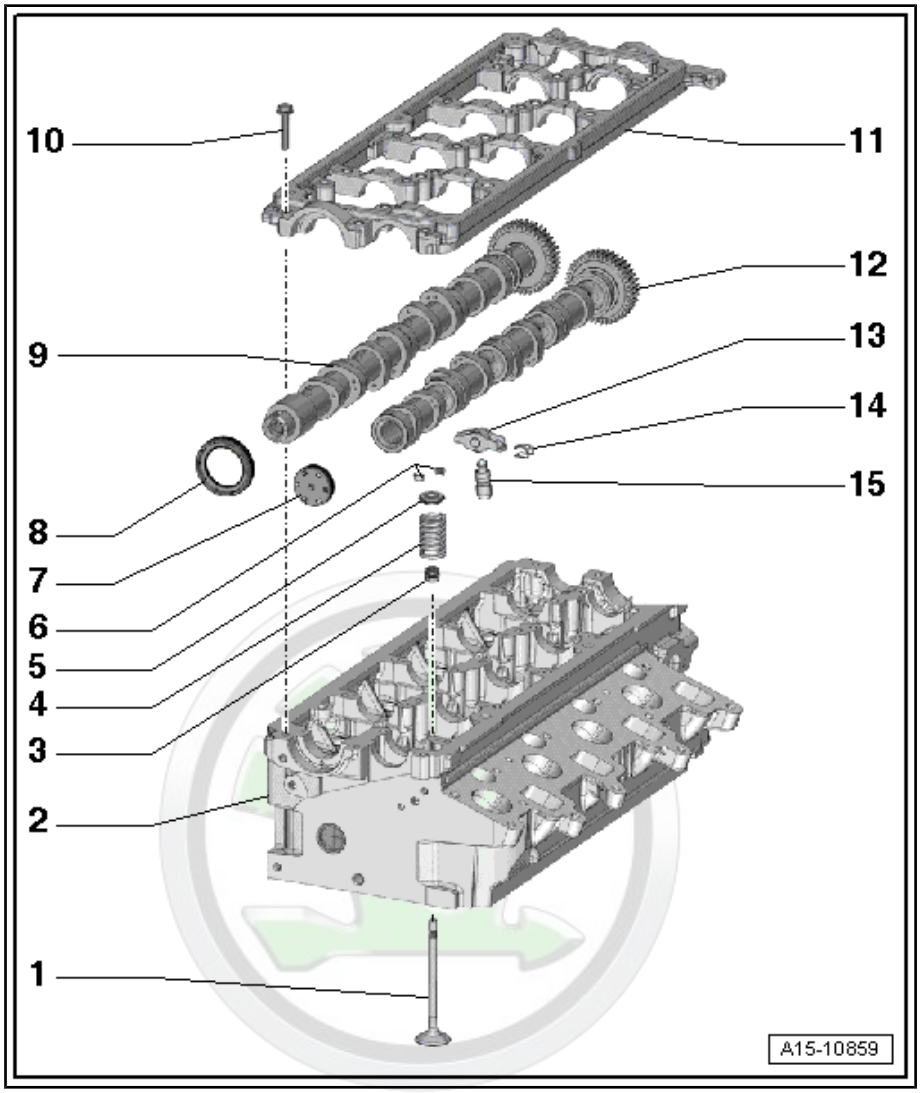
⇒ “2.1 Assembly overview - valve gear”, page 107
⇒ “2.2 Replacing camshaft sealing ring”, page 109
⇒ “2.3 Removing and installing camshafts”, page 112
⇒ “2.4 Measuring the axial play of the camshafts”, page 117
⇒ “2.5 Checking hydraulic balancing elements”, page 117
⇒ “2.6 Replacing valve stem seals”, page 118
⇒ “2.7 Valve dimensions”, page 124
⇒ “2.8 inspecting valve guides”, page 124

2.1 Assembly overview - valve gear

Note

- *After installing the camshafts, the engine must not be cranked or started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise the valves would strike the pistons).*
- *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*
- *Always replace gasket rings and seals.*

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1 - Valve

- ❑ do not rework, only grinding in is permissible
- ❑ mark the fitting position for re-installation
- ❑ Valve dimensions ⇒ “2.7 Valve dimensions”, page 124
- ❑ inspecting valve guides ⇒ “2.8 inspecting valve guides”, page 124

2 - Cylinder head

- ❑ pay attention to the notes ⇒ “1.2 Summary of components - cylinder head”, page 89
- ❑ check for distortion ⇒ page 92
- ❑ Removing and installing ⇒ “1.5 Removing and installing cylinder head”, page 95
- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

3 - Valve stem gasket

- ❑ Replace ⇒ “2.6 Replacing valve stem seals”, page 118

4 - Valve spring

5 - Valve spring plate

6 - Valve collets

7 - Screw cap

- ❑ Replace after disassembly
- ❑ Remove: if the bearing frame is built in, insert a screwdriver and lever out
- ❑ Install: drive in flush with a suitable thrust piece without sealant

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8 - Sealing ring

- ❑ Do not additionally lubricate or grease sealing lip of the gasket ring
- ❑ Remove oil residue on the camshaft stud with a clean cloth
- ❑ before fitting, cover slot on the camshaft cone with adhesive tape (e.g., with Scotch tape)
- ❑ Removing and installing ⇒ “2.2 Replacing camshaft sealing ring”, page 109

9 - Camshaft

- ❑ for exhaust valves
- ❑ Pay attention to version, up to 01.10 with double gear wheel
- ❑ Removing and installing ⇒ “2.3 Removing and installing camshafts”, page 112
- ❑ Measure axial play ⇒ “2.4 Measuring the axial play of the camshafts”, page 117

10 - Screw

- ❑ Tightening sequence ⇒ “2.3 Removing and installing camshafts”, page 112
- ❑ 10 Nm

11 - Bearing frame

- ❑ with integrated camshaft bearings
- ❑ Pay attention to sequence for loosening and tightening ⇒ “2.3 Removing and installing camshafts”, page 112
- ❑ seal with silicone sealant ⇒ ETKA - Electronic catalogue of original parts

12 - Camshaft

- ❑ for inlet valves
- ❑ Removing and installing ⇒ “2.3 Removing and installing camshafts”, page 112
- ❑ Measure axial play ⇒ “2.4 Measuring the axial play of the camshafts”, page 117

13 - Roller rocker finger

- ❑ Mark installation position
- ❑ Do not interchange
- ❑ inspect roller bearings for smooth operation
- ❑ oil contact surfaces

14 - Locking clip

- ❑ check for firm seating

15 - Hydraulic supporting element

- ❑ Mark installation position
- ❑ oil the contact surfaces before installing
- ❑ Check ⇒ “2.5 Checking hydraulic balancing elements”, page 117 .

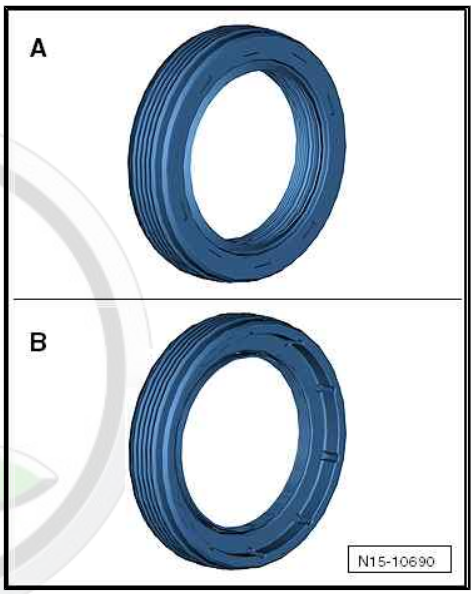
2.2 Replacing camshaft sealing ring

⇒ “2.2.1 Vehicles with old gasket ring”, page 109

⇒ “2.2.2 Vehicles with new gasket ring”, page 111

Note

A new gasket ring is continuously inserted -B-, on which no closed surface is visible between the camshaft and the cylinder head but rather a hollow rounding is apparent. Here another work procedure must be performed
⇒ “2.2.2 Vehicles with new gasket ring”, page 111 .



2.2.1 Vehicles with »old« gasket ring

Special tools and workshop equipment required

- ♦ Insertion tool - MP1-214 (10-203)-
- ♦ Sealing ring extractor - T30003 (3240)-
- ♦ Screw M12 x 1.5 x 75 from the insertion tool - MP1-214 (10-203)-

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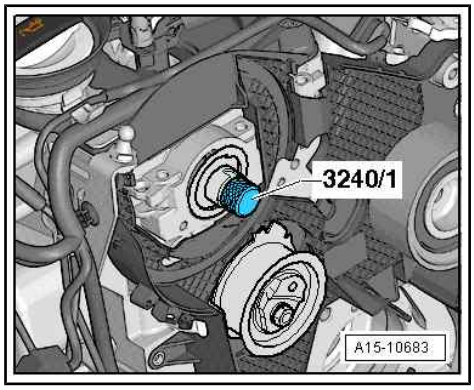
Removing

– Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Remove camshaft sprocket and hub
⇒ “2.3 Removing and installing camshafts”, page 112 .

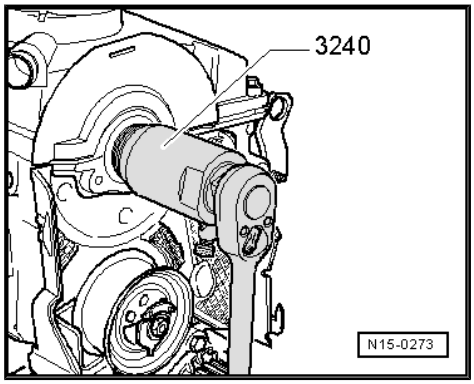
– Insert thrust piece -3240/1- into the camshaft.

– Unscrew inner part of the gasket ring extractor -3240- two turns (approx. 3 mm) out of the outer part and lock with knurled screw.



– Oil the thread head of the sealing ring extractor, position and fix screw into the sealing ring as far as possible.

– Release knurled screw and turn the inner side against the camshaft until the gasket ring is pulled out.



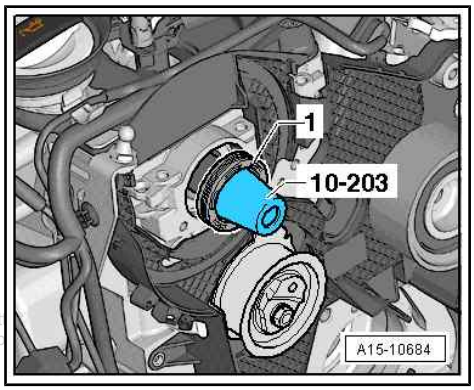
Installing

Note

The sealing lip of the new gasket ring must neither be oiled nor greased additionally.

– Fit the guide bushing from -MP1-214 (10-203)- onto the camshaft as shown in the illustration.

– Carefully slide the gasket ring -1- over the guide bushing onto the camshaft.

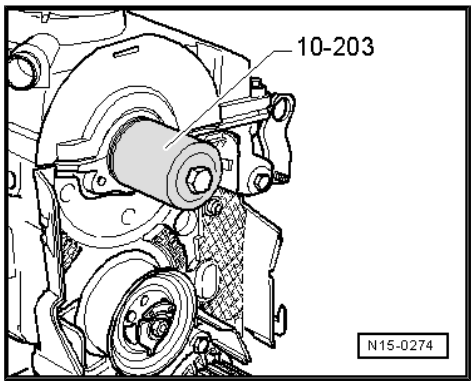


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– Press in the gasket ring with the thrust piece of the insertion tool - MP1-214 (10-203)- and the screw M12 x 1.5 x 75 up to the stop.

– Install the hub and the camshaft sprocket
⇒ “2.3 Removing and installing camshafts”, page 112 .

– Install the toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .



2.2.2 Vehicles with »new« gasket ring

Special tools and workshop equipment required

- Insertion tool - MP1-214 (10-203)-
- Sealing ring extractor - T10443-
- Screw M12 x 1.5 x 75 from the insertion tool - MP1-214 (10-203)-

Removing

– Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Remove camshaft sprocket and hub
⇒ “2.3 Removing and installing camshafts”, page 112 .

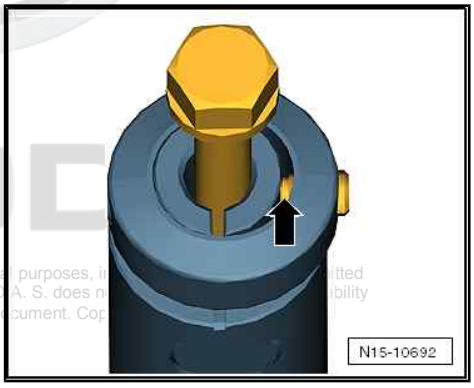
WARNING

If it is turned back too much, the inner pressure plate loosens from the pressure screw. In this case, the pressure plate must be pressed onto the pressure screw once again.

– Turn back the pressure screw of the gasket ring extractor »with fingertip touch« until a slight resistance can be felt.

Note

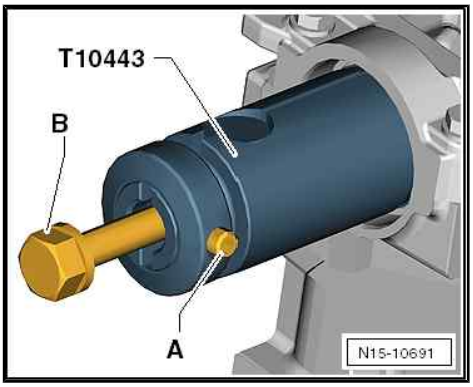
The clamping sleeves of the gasket ring extractor have grub screws. However, the clamping occurs by means of only one of these grub screws -arrow- while the other ones are tightly bolted.



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– Position the gasket ring extractor straight as shown and screw in the grub screw -A- until the gasket ring extractor clamps.

– Screw in the pressure screw -B- until the gasket ring is pulled out.



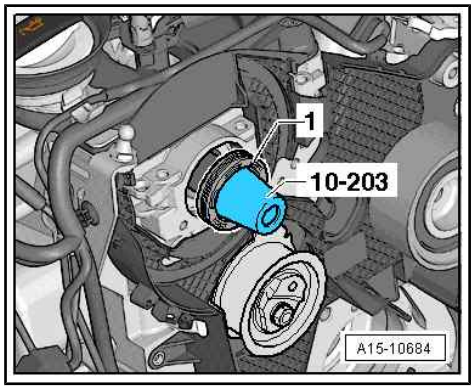
Installing

Note

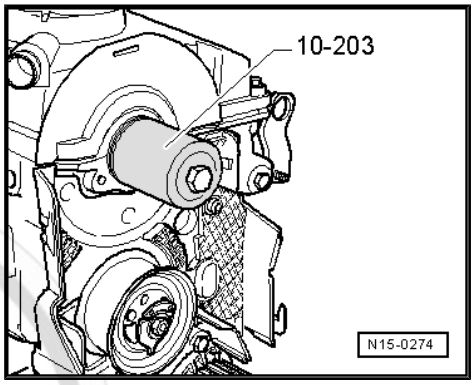
The sealing lip of the gasket ring must neither be oiled nor greased.

– Remove oil residue on the camshaft stud with a clean cloth.

– Fit the guide bushing from -MP1-214 (10-203)- onto the camshaft as shown in the illustration. The inscription on the sealing ring points outwards.
– Carefully slide the gasket ring -1- over the guide bushing onto the camshaft.



– Press in the sealing ring with the thrust piece of the insertion tool - MP1-214 (10-203)- and the screw M12 x 1.5 x 75 up to the stop.
– Install the hub and the camshaft sprocket
⇒ “2.3 Removing and installing camshafts”, page 112 .
– Install the toothed belt
⇒ “1.7 Removing and installing toothed belt”, page 49 .



2.3 Removing and installing camshafts

Special tools and workshop equipment required

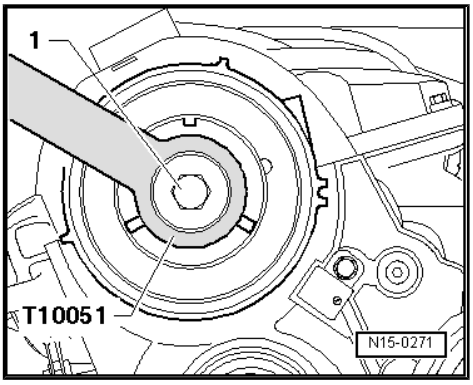
- Counterholder - T10051-
- Extractor - T10052-
- Camshaft-insertion tool - T40094-
- Mounting bracket - T40095-
- Clamping device - T40096/1-
- Silicone sealant ⇒ ETKA - Electronic catalogue of original parts
- Sealant remover Gasket Stripper (stock code GST, stock item No. R 34402), manufacturer Retech s.r.o.
- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves

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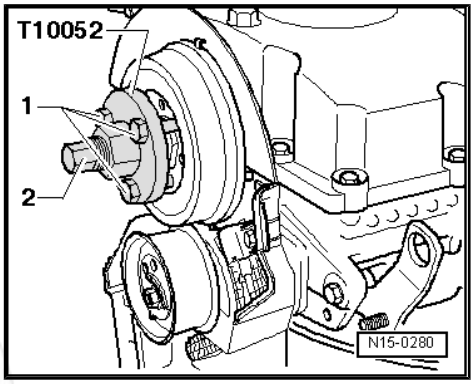
Removing

• Cylinder head fitted.
– Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump
⇒ “1.7 Removing and installing toothed belt”, page 49 .
– Remove cylinder head cover
⇒ “1.3 Removing and installing cylinder head cover”, page 92 .
– Remove camshaft sprocket.

– Slacken screw -1- for the hub of the camshaft, to do so counterhold with counterholder - T10051- .
– Release screw by about 2 turns.



– Position the extractor - T10052- at the hub of the camshaft and screw the screws -1- into the hub.
– Slacken the hub of the toothed belt sprocket from the camshaft cone by uniformly tightening the screw of the extractor -2-.

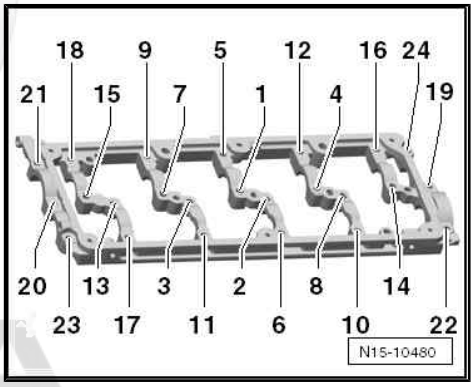


Note

While doing so, hold the extractor firmly using a wrench SW 30.

– Remove hub of toothed belt sprocket from cone of camshaft.
– Remove vacuum pump
⇒ “1.7 Removing and installing the vacuum pump”, page 104 .

– Loosen the screws for the bearing frame in the sequence -24 … 1-.
– Unscrew screws and carefully separate the bearing frame from the cylinder head.
– Mark the camshafts for reinstalling and remove.



Installing

WARNING

Wear protective gloves and goggles when working with gasket remover and degreasing agent!

– Remove residual sealant on the bearing frame and cylinder head using a chemical sealant remover.
– Clean sealing surfaces, they must be free of oil and grease.
– Oil contact surfaces of camshafts.

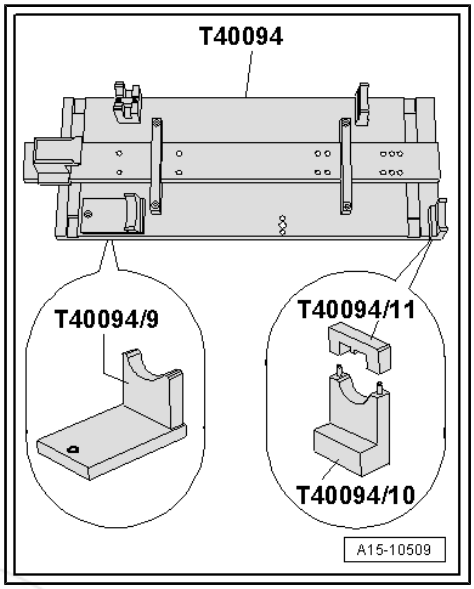
Caution

The camshafts must only be installed using the camshaft-insertion tool - T40094- as described in the following, otherwise the axial bearing in the bearing frame can be destroyed and the cylinder head must be replaced.

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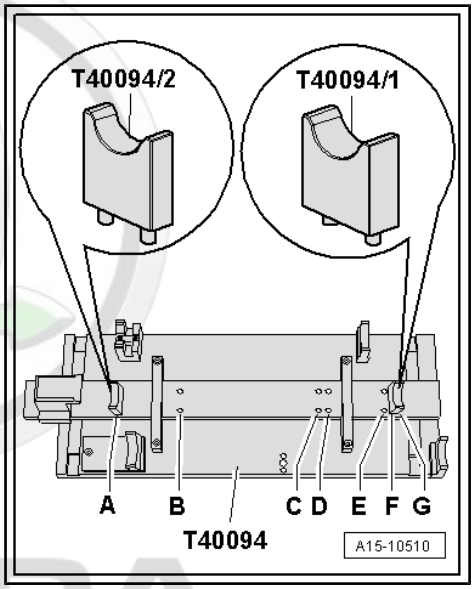
Set up the camshaft-insertion tool - T40094- as follows:

– Tighten the supports -T40094/9- and -T40094/10- (with bearing bracket - T40094/11-) to the base plate edge points as shown in the figure. Remove other screwed-on supports at these points if required.



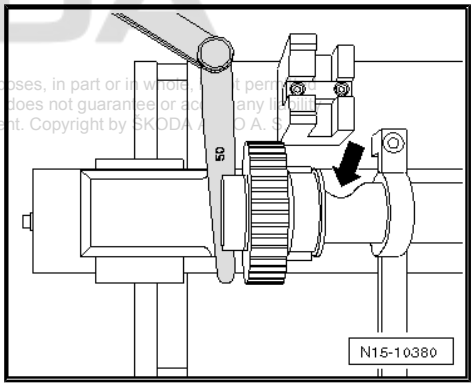
– Position the support -T40094/1- onto the plug location -F- and the support -T40094/2- onto the plug location -A-.

– Insert the inlet camshaft in the supports -T40094/1- and -T40094/2- .



The protrusion -arrow- of the cylinder head bolt must point to the outside.

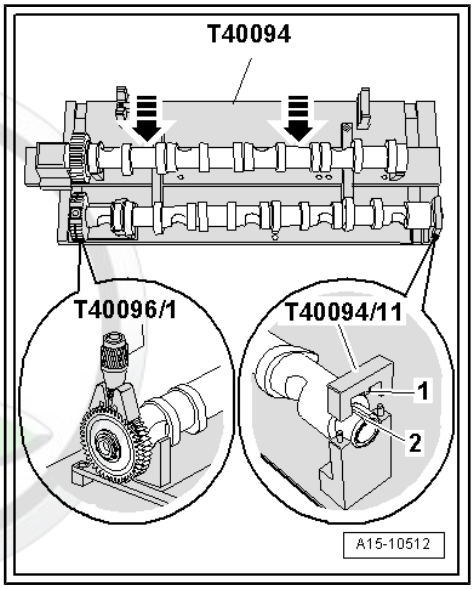
– Fit on a feeler gauge of 0.50 mm and slide the support -T40094/8- into the groove of the inlet camshaft.



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– Insert the outlet camshaft in the supports -T40094/9- and -T40094/11- and lock with serration of detent bracket -T40094/11-

• The serration -1- of the detent bracket must engage into the groove -2- in the outlet camshaft.



Outlet camshafts with double gear wheel

– Position the tensioning tool - T40096/1- on the pinions of the outlet camshaft in such a way that each clamping arm engages in a pinion.

• The wider clamping arm must engage in the wider pinion.

– Tension the tensioning tool - T40096/1- with the knurled wheel until the tooth flanks of both wheels are aligned.

Continued for all outlet camshafts

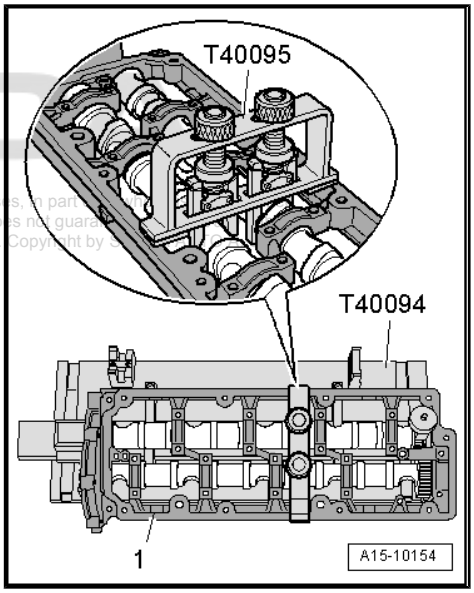
– Slide the inlet camshaft -arrows- to the outlet camshaft until the serrations engage.

– Position the bearing frames onto the camshafts.

• All of the camshaft bearings must rest on the camshafts.

– Position the bracket - T40095- , as shown in the figure, and fix the camshafts in the bearing frame.

– Remove the detent bracket - T40094/11- and pull the support - T40094/8- out of the groove of the inlet camshaft.

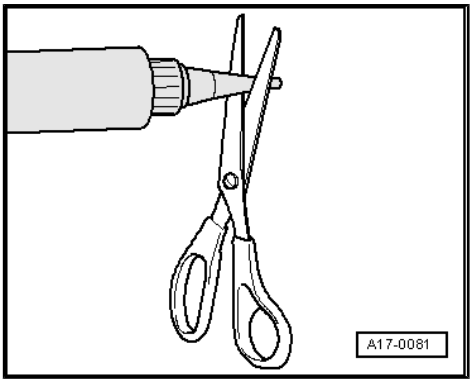


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Note

Pay attention to the use by date on the silicone sealant.

– Cut off nozzle tube at the front marking (∅ of nozzle approx. 2 mm).



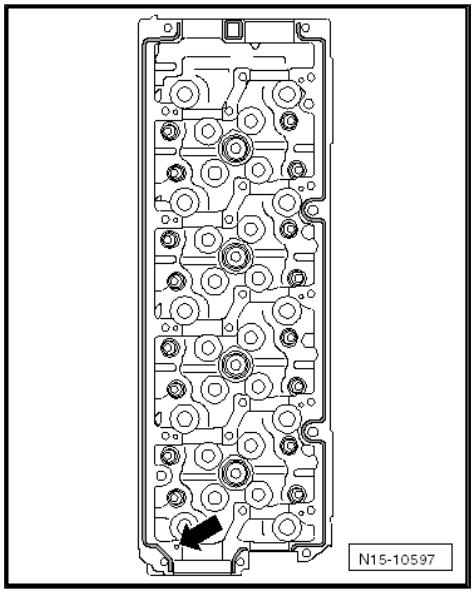
Caution

Risk of contamination of the camshaft bearings through excess sealant.

♦ ***The sealant bead must not be thicker than specified.***

– Apply sealant onto the clean sealing surface of the cylinder head as shown in the illustration.

- Thickness of the sealant beads: 2…3 mm
- The oil duct for the bearing frame -arrow- must not be clogged with excess sealant.



Note

The bearing frame with camshafts must be installed within 5 minutes after applying the silicone sealant.

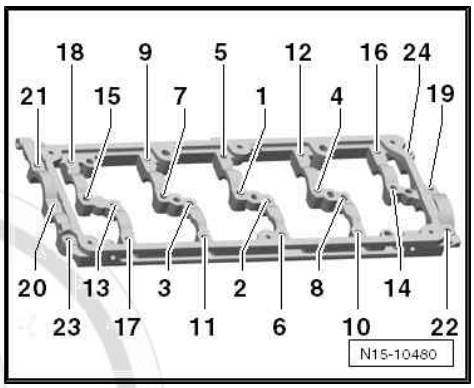
– Remove the camshafts together with the bearing frame using the camshaft-insertion tool - T40095- and remove the outlet camshafts with double gear wheel using the tensioning tool - T40096/1- from the camshaft-insertion tool - T40094- and carefully insert into the bearings in the cylinder head.

– Insert the screws of the bearing frame and first tighten in the sequence -1 … 24- by hand.

- The bearing frame must rest on the cylinder head with its complete contact surface.

– Tighten the bearing frame screws in the order -1-24- to the specified torque.

– Remove the camshaft-insertion tool - T40095- and on outlet camshafts with double gear wheel remove the tensioning tool - T40096/1- as well.



The further assembly is carried out in the reverse order, while paying attention to the following:

– Replacing camshaft gasket ring
⇒ “2.2 Replacing camshaft sealing ring”, page 109 .

– Drive in new screw cap.

– Install vacuum pump
⇒ “1.7 Removing and installing the vacuum pump”, page 104 .

– Install cylinder head cover
⇒ “1.3 Removing and installing cylinder head cover”, page 92 .

Note

- *After installing the camshafts, the engine must not be cranked or started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise the valves would strike the pistons).*
- *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*

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Tightening torques - summaries of components

- Screws of the bearing frame
⇒ “2.1 Assembly overview - valve gear”, page 107 .
- ⇒ “1.2 Assembly overview - toothed belt drive”, page 42

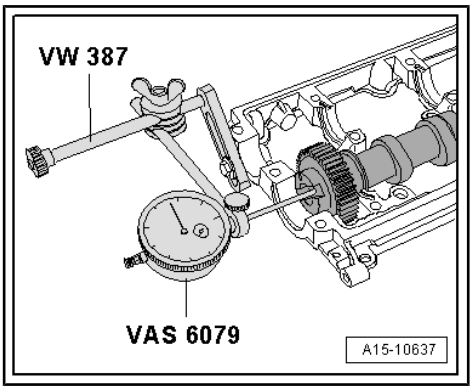
2.4 Measuring the axial play of the camshafts

Special tools and workshop equipment required

- Universal dial gauge bracket - MP3-447 (VW 387)-
- Dial gauge , e.g. -VAS 6079-

– Remove bearing frame
⇒ “2.3 Removing and installing camshafts”, page 112 .

– Attach the dial gauge with the universal dial gauge holder - MP3-447 (VW 387)- to the bearing frame as shown in the illustration.



– Press the camshaft by hand against the dial gauge.

– Position dial gauge to “0”.

– Press the camshaft off the dial gauge and read the value.

Axial play of inlet camshaft and outlet camshaft:

- Wear limit 0.17 mm

2.5 Checking hydraulic balancing elements

Note

- *The hydraulic balancing elements cannot be repaired.*
- *Irregular valve noises when starting engine are normal.*
- *If the irregular valve noises disappear after prolonged use but occur regularly during short journeys, then the oil pressure must be checked*
⇒ “1.15 Testing oil pressure switch F1 and oil pressure”, page 152 .
- *The valve for oil pressure control is integrated in the oil pump.*

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Special tools and workshop equipment required

- Feeler gauge

– Start engine and allow to run until the radiator fan starts.

– Increase speed to about 2500 rpm for 2 minutes and undertake a test drive if necessary.

If the valve noises occur irregularly, determine the defective hydraulic balancing element as follows:

– Remove cylinder head cover
⇒ “1.3 Removing and installing cylinder head cover”, page 92 .

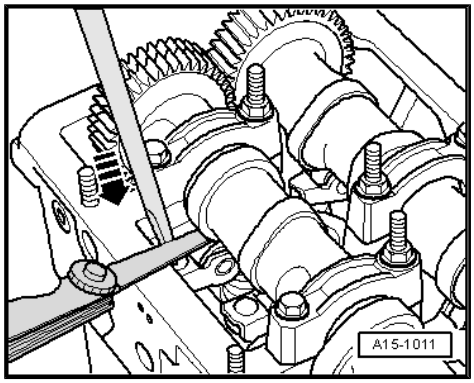
– Turn the crankshaft until the cam of the hydraulic balancing element to be tested is positioned on top.

– Press down the hydraulic balancing element using a wooden or plastic wedge.

– Determine the play between the cam and the roller of the valve lever.

If a 0.20 mm feeler gauge can be slipped between the cam and the roller of the valve lever, the hydraulic balancing element is defective:

– Replace the hydraulic balancing element. To do so, remove camshafts
⇒ “2.3 Removing and installing camshafts”, page 112 .



Note

- *After installing the camshafts, the engine must not be started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise valves would strike the pistons).*
- *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*

2.6 Replacing valve stem seals

⇒ “2.6.1 Replacing the valve stem seals on an installed cylinder head”, page 118

⇒ “2.6.2 Replacing the valve stem seals on a removed cylinder head”, page 121

2.6.1 Replacing the valve stem seals on an installed cylinder head

Special tools and workshop equipment required

- Valve stem seal extractor - MP1-230 (3364)-
- valve stem seal insertion tool - MP1-233 (3365)-
- Disassembly and assembly device for valve collets - VAS 5161- with spacer -VAS 5161/23-1- and guide plate -VAS 5161/23-
- Screw M6 x 30 (2 pieces)

– Remove all glow plugs
⇒ “1.1 Removing and installing glow plugs”, page 360 .

– Remove the camshafts
⇒ “2.3 Removing and installing camshafts”, page 112 .

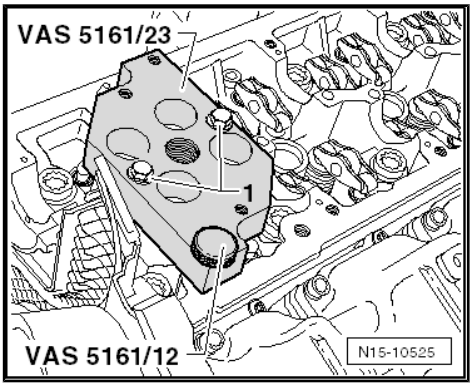
– When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.

– Remove the roller rocker arms together with the hydraulic balancing elements and lay aside on a clean surface.

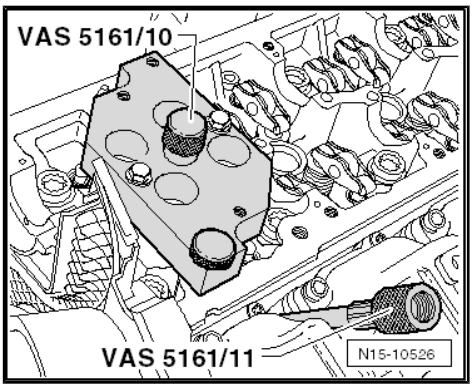
– Put the piston of the relevant cylinder at “bottom dead centre”.

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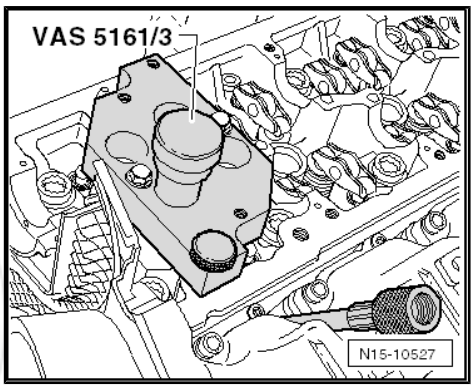
– Position the guide plate - VAS 5161/23- onto the cylinder head.
– Screw the guide plate at the side of the intake manifold with the knurled screw - VAS 5161/12- to the cylinder head and with 2 screws M6 x 30 -1- by hand until it fits on tightly.



– Screw the sealing bolt - VAS 5161/10- into the guide plate.
– Screw adapter - VAS 5161/11- into the threaded hole of the glow plug by hand.

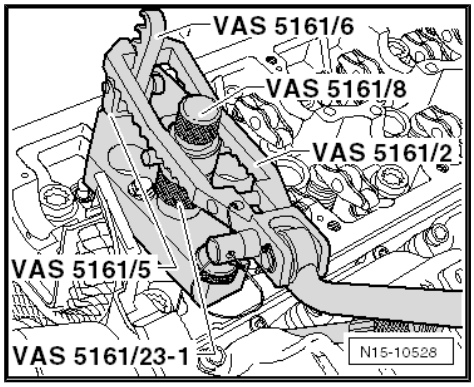


– Insert the impact drift - VAS 5161/3- into the guide plate and slacken the tightly fitted valve collets using a plastic hammer.

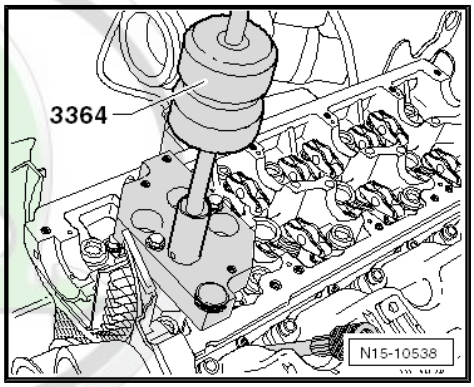


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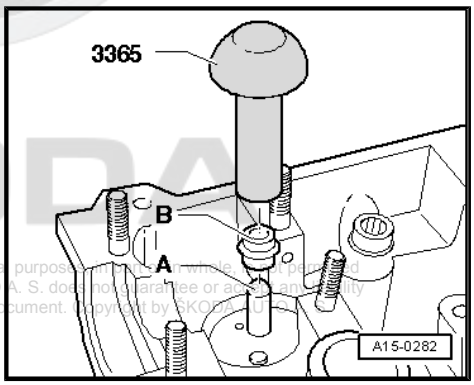
– Screw the detent part - VAS 5161/6- and the interlocking fork - VAS 5161/5- into the guide plate.
– Slide spacer -VAS 5161/23-1- onto the assembly cartridge - VAS 5161/8- .
– Connect the adapter - VAS 5161/11- to the compressed air with a commercially available intermediate piece and apply constant pressure.
• Minimum pressure: 0.6 MPa (6 bar)
– Hook the pressure fork - VAS 5161/2- onto the detent part and push the assembly cartridge downwards.
– Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
– Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
– Release the pressure fork.
– Remove assembly cartridge with spacer.
– Remove the valve spring with the valve spring retainer.



– Pull off valve stem seal with the valve steam seal extractor - 3364- .



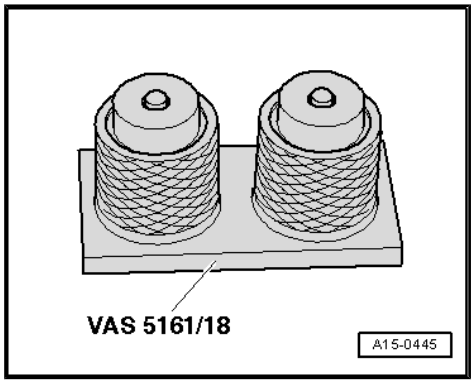
– Fit the protective plastic bushing -A-, which is attached to the new valve stem seals -B-, onto the valve stem.
– Lightly oil sealing lip of the new valve stem seal.
– Slide the valve stem seal onto the plastic bushing.
– Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
– Remove plastic sleeve.



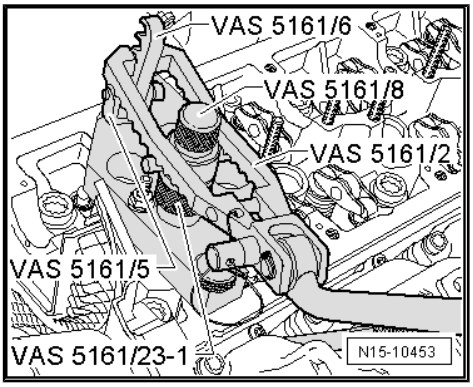
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If the valve collets were removed from the assembly cartridge, they must be inserted into the insertion device - VAS 5161/18- first.

• The large diameter of the valve collets points to the top.
– Insert the valve spring and the valve spring retainer.
– Press the assembly cartridge - VAS 5161/8- from the top onto the insertion device for valve collets -VAS 5161/18- and lift up the valve collets.



– Re-insert the assembly cartridge into the guide plate - VAS 5161/23- .
– Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.
– Release the pressure fork on tightened knurled screw.
– Repeat the procedure for each valve.



Assembling

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Ensure that all the roller arms are correctly positioned on the valve stem ends and are clipped in place on the relevant hydraulic balancing elements.

– Install camshafts
⇒ “2.3 Removing and installing camshafts”, page 112 .
– Install glow plugs
⇒ “1.1 Removing and installing glow plugs”, page 360 .

2.6.2 Replacing the valve stem seals on a removed cylinder head

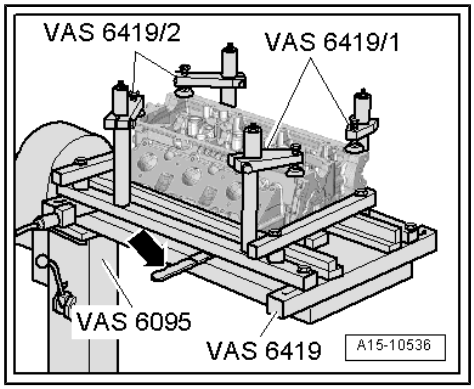
Special tools and workshop equipment required

♦ Valve stem seal extractor - MP1-230 (3364)-
♦ valve stem seal insertion tool - MP1-233 (3365)-
♦ Disassembly and assembly device for valve collets - VAS 5161- with spacer -VAS 5161/23-1- and guide plate -VAS 5161/23-
♦ Cylinder head tensioning device - VAS 6419-
♦ Engine and gearbox mount - VAS 6095-
♦ Screw M6 x 30 (2 pieces)

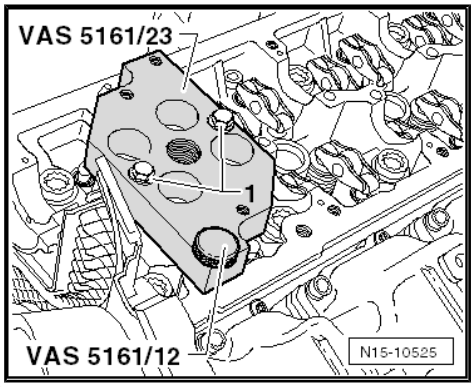
– Remove the camshafts
⇒ “2.3 Removing and installing camshafts”, page 112 .
– When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.
– Remove the roller rocker arms together with the hydraulic balancing elements and lay aside on a clean surface.
– Insert the cylinder head tensioning device - VAS 6419- into the engine and gearbox jack - VAS 6095- .

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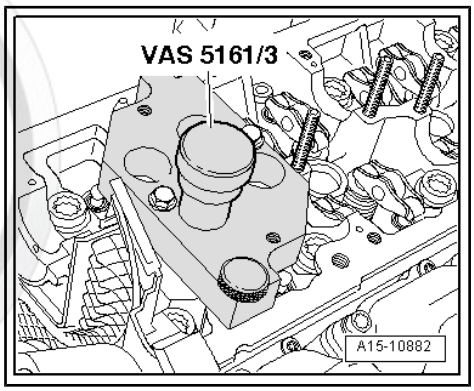
– Tension the cylinder head in the cylinder head tensioning device - VAS 6419- , as shown in the illustration.
– Connect cylinder head tensioning device - VAS 6419- to compressed air.
– Adjust the air bellows with the lever -arrow- below the combustion chamber on which the valve stem oil seals should be removed.
– Allow enough air to enter the air bellows so that it rests against the valve discs.



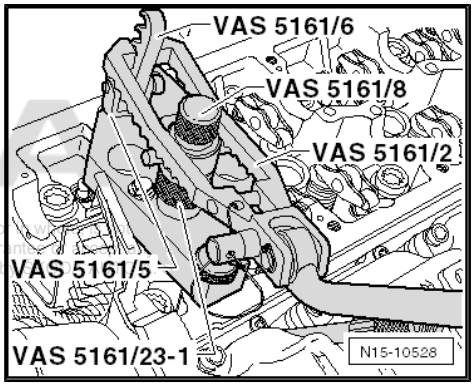
– Position the guide plate - VAS 5161/23- onto the cylinder head.
– Screw the guide plate at the side of the intake manifold with the knurled screw - VAS 5161/12- to the cylinder head and with 2 screws M6 x 30 -1- by hand until it fits on tightly.



– Insert the impact drift - VAS 5161/3- into the guide plate and slacken the tightly fitted valve collets using a plastic hammer.

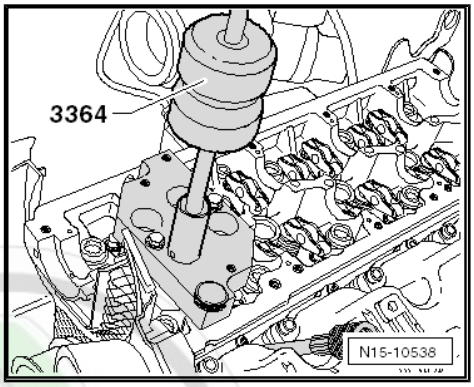


– Screw the detent part - VAS 5161/6- and the interlocking fork - VAS 5161/5- into the guide plate.
– Slide spacer -VAS 5161/23-1- onto the assembly cartridge - VAS 5161/8- .
– Hook the pressure fork - VAS 5161/2- onto the detent part and push the assembly cartridge downwards.
– Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
– Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
– Release the pressure fork.
– Remove assembly cartridge with spacer.
– Remove the valve spring with the valve spring retainer.

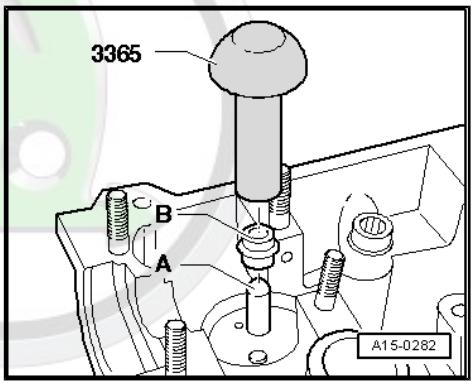


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– Pull off valve stem seal with the valve steam seal extractor - 3364- .

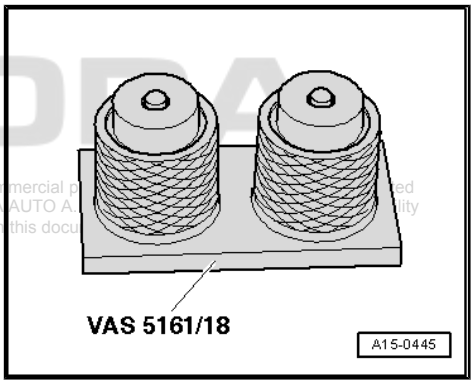


– Fit the protective plastic bushing -A-, which is attached to the new valve stem seals -B-, onto the valve stem.
– Lightly oil sealing lip of the new valve stem seal.
– Slide the valve stem seal onto the plastic bushing.
– Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
– Remove plastic sleeve.

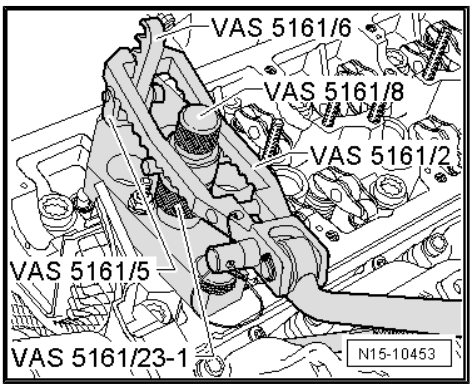


If the valve collets were removed from the assembly cartridge, they must be inserted into the insertion device - VAS 5161/18- first.

• The large diameter of the valve collets points to the top.
– Insert the valve spring and the valve spring retainer.
– Press the assembly cartridge - VAS 5161/8- from the top onto the insertion device for valve collets -VAS 5161/18- and lift up the valve collets.



– Re-insert the assembly cartridge into the guide plate - VAS 5161/23- .
– Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.
– Release the pressure fork on tightened knurled screw.
– Repeat the procedure for each valve.



Assembling

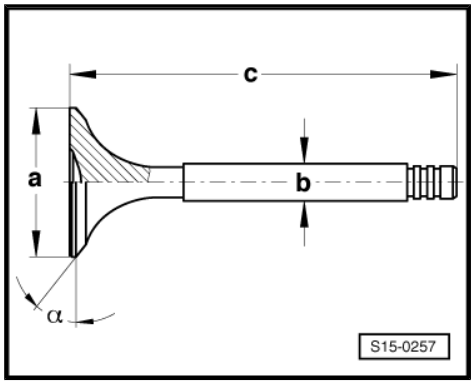
Assembly is carried out in the reverse order. When installing, observe the following:

Note

Ensure that all the roller arms are correctly positioned on the valve stem ends and are clipped in place on the relevant hydraulic balancing elements.

– Install camshafts
⇒ “2.3 Removing and installing camshafts”, page 112 .

2.7 Valve dimensions



Dimension		Inlet valve	Exhaust valve
∅ a	mm	26.6	26.0
∅ b	mm	5.975	5.965
c	mm	99.3	99.1
α	∠°	45	45

Note

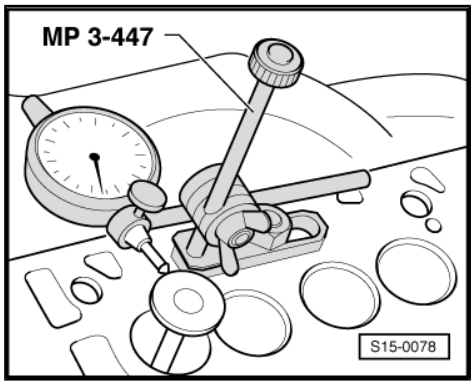
Valves must not be reworked. Only lapping-in is permitted.

2.8 inspecting valve guides

Special tools and workshop equipment required

- Universal dial gauge bracket - MP3-447 (VW 387)-
- Dial gauge , e.g. -VAS 6079-

Test sequence



Note

- *If the valves are replaced when carrying out repair work, use new valves for the measurement.*
- *Because of the different stem diameters only use inlet valve in inlet guide or outlet valve in outlet guide.*

– Insert valve into valve guide. End of valve stem must be flush with guide.

• Valve rock: max. 1.0 mm

Note

If the wear limit is exceeded, repeat measurement with new valves. If the wear limit is again exceeded, replace cylinder head. The valve guides cannot be changed.

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17 – Lubrication

1 Removing and installing parts of the lubrication system

⇒ “1.1 Summary of components - lubrication system (Octavia II, Yeti)”, page 126

⇒ “1.2 Summary of components - lubrication system (Superb II)”, page 128

⇒ “1.3 Summary of components - oil filter with engine oil cooler”, page 131

⇒ “1.4 Removing and installing oil level and oil temperature sender G266 ”, page 132

⇒ “1.5 Removing and installing the oil filter holder with the engine oil cooler”, page 133

⇒ “1.6 Removing and installing engine oil cooler”, page 136

⇒ “1.7 Removing and installing oil pan”, page 138

⇒ “1.8 Removing and installing oil pump (Octavia II, Yeti)”, page 141

⇒ “1.9 Removing and installing oil pump (Superb II)”, page 142

⇒ “1.10 Removing and installing balancing shaft module (Superb II)”, page 143

⇒ “1.11 Installing new balancing shaft module (Superb II)”, page 144

⇒ “1.12 Installing balancing shaft module that has already been used (Superb II)”, page 147

⇒ “1.13 Replacing the crankshaft drive pinion (Superb II)”, page 149

⇒ “1.14 Removing and installing oil pressure switch F1 ”, page 151

⇒ “1.15 Testing oil pressure switch F1 and oil pressure”, page 152

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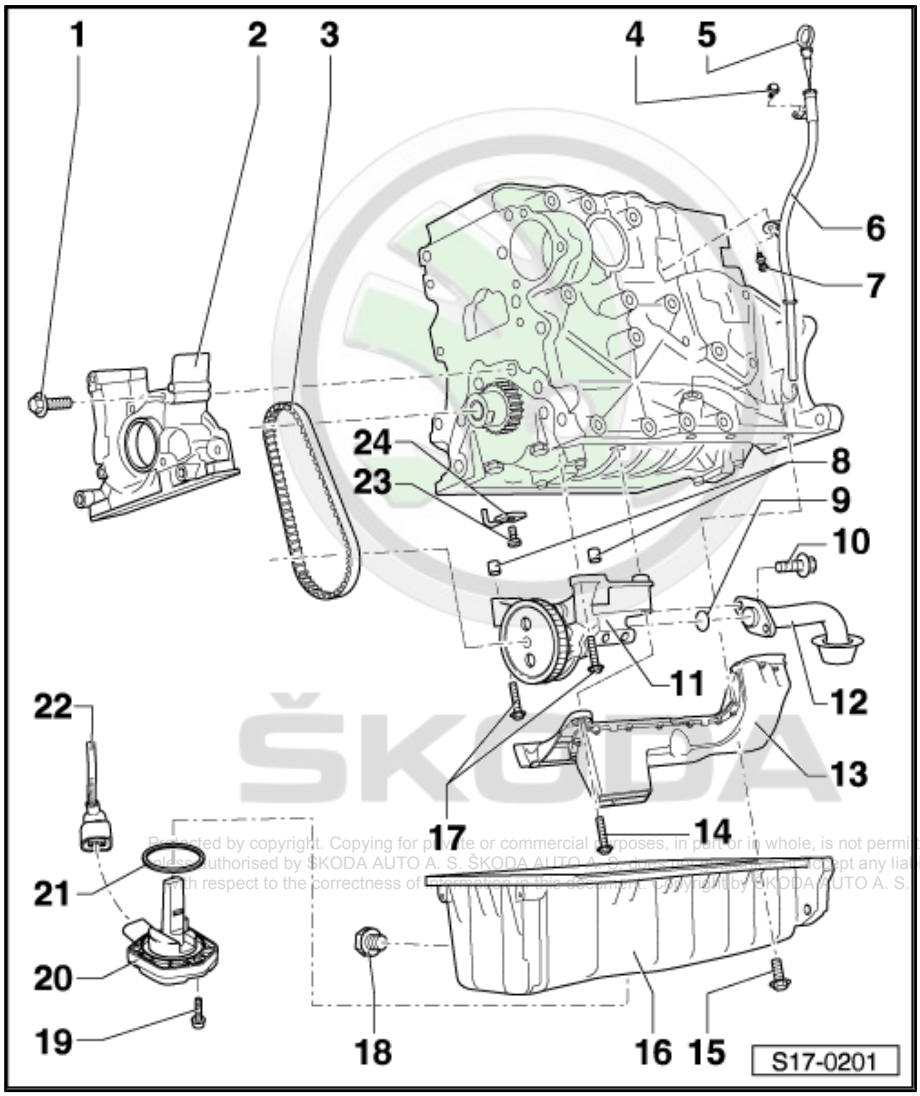
Note

- *The oil pressure switch - F1- is located on the cylinder head. Therefore it is listed in the summary of components ⇒ “1.2 Summary of components - cylinder head”, page 89 .*
- *Remove and install oil pressure switch - F1- ⇒ “1.14 Removing and installing oil pressure switch F1 ”, page 151 .*
- *Test oil pressure switch - F1- ⇒ “1.15 Testing oil pressure switch F1 and oil pressure”, page 152 .*

1.1 Summary of components - lubrication system (Octavia II, Yeti)

Note

- *If considerable quantities of metal swarf as well as abrasion is found in the engine oil when carrying out engine repairs, carefully clean the oil galleries in order to avoid consequential damage and additionally replace the oil injection nozzles and the engine oil cooler as well as the oil filter element.*
- *Oil spray nozzle and pressure relief valve* *⇒ page 83*



1 - Screw
- ❑ 15 Nm

2 - Sealing flange
- ❑ on belt pulley side
- ❑ must be positioned on dowel sleeves
- ❑ Removing and installing ⇒ “2.4 Removing and installing the sealing flange on the belt pulley side”, page 65
- ❑ Replace crankshaft seal on belt pulley side ⇒ “2.3 Replacing crankshaft sealing ring on the belt pulley side”, page 64

3 - Toothed belt
- ❑ for oil pump drive
- ❑ Check for wear and damage, replace if necessary
- ❑ mark the fitting position for re-installation

4 - Screw
- ❑ 10 Nm

5 - Dipstick
- ❑ Oil level must not exceed the max. marking

6 - Guide tube

7 - Retaining clip

8 - Fitting sleeve

9 - O-ring
- ❑ Replace after disassembly

10 - Screw
- ❑ 10 Nm

11 - Oil pump
- ❑ with pressure control valve 0.45 MPa (4.5 bar)
- ❑ with safety valve 1,0 MPa (10.0 bar)
- ❑ Removing and installing ⇒ “1.8 Removing and installing oil pump (Octavia II, Yeti)”, page 141

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- ❑ before installing, check whether both dowel sleeves are present
- ❑ if there is any scoring on the contact surfaces of the gears, replace
- ❑ Tightening torque of oil pump cover at oil pump housing: 10 Nm

If the toothed belt or the oil pump must be removed:

- ♦ Check smooth operation of oil pump:
- ♦ It must be possible to easily turn the toothed belt sprocket with the finger
- ♦ if the oil pump is sluggish, it must be replaced
  ⇒ “1.8 Removing and installing oil pump (Octavia II, Yeti)”, page 141

12 - Intake manifold

- ❑ Clean strainer if dirty

13 - Baffle

14 - Screw

- ❑ 15 Nm

15 - Screw

- ❑ Pay attention to sequence for loosening and tightening
  ⇒ “1.7 Removing and installing oil pan”, page 138
- ❑ 13 Nm

16 - Oil pan

- ❑ Removing and installing ⇒ “1.7 Removing and installing oil pan”, page 138
- ❑ install with silicone sealant ⇒ ETKA - Electronic catalogue of original parts

17 - Screw

- ❑ 15 Nm

18 - Drain plug

- ❑ with integrated sealing ring
- ❑ Replace after disassembly
- ❑ 30 Nm

19 - Screw

- ❑ Replace after disassembly
- ❑ 10 Nm

20 - Oil level and oil temperature transmitter - G266-

- ❑ Check ⇒ Vehicle diagnostic tester.
- ❑ Removing and installing
  ⇒ “1.4 Removing and installing oil level and oil temperature sender G266 ”, page 132

21 - O-ring

- ❑ Replace after disassembly

22 - Line

- ❑ to oil level and oil temperature encoder

23 - Pressure valve

- ❑ opens at 0.25..0.32 MPa (2.5..3.2 bar) overpressure
- ❑ replace without sealant
- ❑ Removing and installing ⇒ “3.3 Assembly overview - piston and conrod”, page 80
- ❑ 24 Nm

24 - Oil spray jet

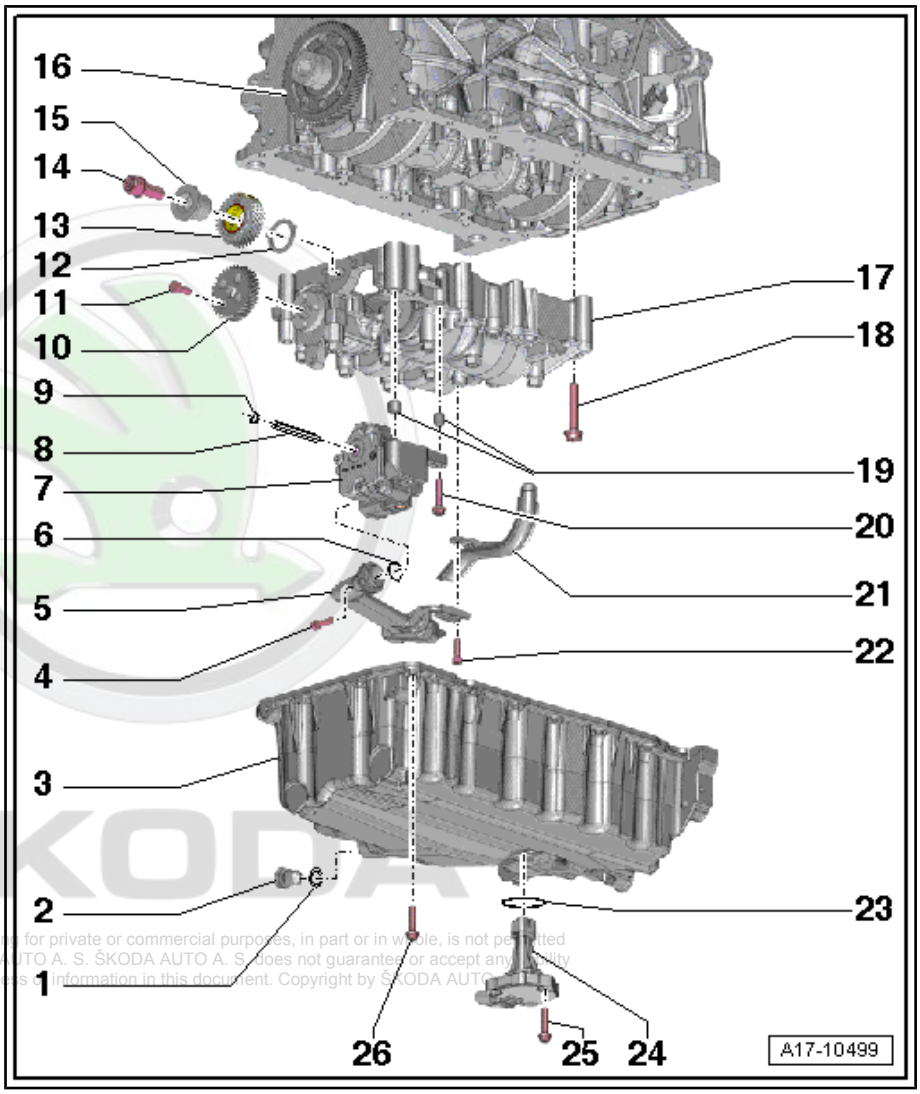
- ❑ for piston cooling
- ❑ Removing and installing ⇒ page 83

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1.2 Summary of components - lubrication system (Superb II)

Note

- *If considerable quantities of metal swarf as well as abrasion is found in the engine oil when carrying out engine repairs, carefully clean the oil galleries in order to avoid consequential damage and additionally replace the oil injection nozzles and the engine oil cooler as well as the oil filter element.*
- *Oil spray nozzle and pressure relief valve ⇒ page 83*



1 - Sealing ring
- ❑ Component part of the drain plug

2 - Drain plug
- ❑ with integrated sealing ring
- ❑ Replace after disassembly
- ❑ 30 Nm

3 - Oil pan
- ❑ Removing and installing ⇒ “1.7 Removing and installing oil pan”, page 138
- ❑ install with silicone sealant ⇒ ETKA - Electronic catalogue of original parts

4 - Screw
- ❑ 9 Nm

5 - Intake manifold
- ❑ Clean strainer if dirty

6 - O-ring
- ❑ Replace after disassembly

7 - Oil pump
- ❑ with pressure control valve 0.45 MPa (4.5 bar)
- ❑ with safety valve 1,0 MPa (10.0 bar)
- ❑ Removing and installing ⇒ “1.9 Removing and installing oil pump (Superb II)”, page 142
- ❑ before installing, check whether both dowel sleeves for centering the balancing shaft module are present
- ❑ if there is any scoring on the contact surfaces of the gears, replace
- ❑ Tightening torque of oil pump cover at oil pump housing: 10 Nm

8 - Drive shaft
- ❑ for oil pump

9 - Circlip
- ❑ must be positioned in the base of the groove

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- ❑ replace damaged or over-extended circlip

10 - Pinion

- ❑ for balancing shaft

11 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 90°

12 - Axial ring

- ❑ for intermediate wheel
- ❑ Replace after disassembly
- ❑ Fitting position ⇒ page 131

13 - Intermediate wheel

- ❑ for drive of balancing shaft
- ❑ Fitting position: part number must be visible.
- ❑ Observe the fitting position of the axial ring -Pos. 12-

Caution

On a new intermediate wheel, the coating of the tooth flanks has a special thickness so that, after their removal, the gear-box has a correct tooth flank clearance of 0.038 ... 0.072 mm when the engine is running.

The new intermediate wheel with undamaged coating is mounted with-out tooth flank clearance.

While carrying out re-pairs, the intermediate wheel must always be used if the conditions for setting the tooth flank clearance in the drive of the balancing shafts change:

When slackening the fix-ing screw Pos. -14- of the intermediate wheel

When replacing the bal-ancing shaft module Pos. -17-

When replacing the drive pinion on the crankshaft -Pos. 16-, or when re-placing the crankshaft

14 - Screw

- ❑ with washer
- ❑ Replace after disassembly
- ❑ 90 Nm + 90°

15 - Hub

- ❑ for intermediate wheel
- ❑ Replace after disassembly

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16 - Drive pinion

- ❑ for crankshaft
- ❑ for drive of balancing shaft module and the oil pump
- ❑ Removing and installing ⇒ “1.13 Replacing the crankshaft drive pinion (Superb II)”, page 149

17 - Balancing shaft module

- ❑ removing ⇒ “1.10 Removing and installing balancing shaft module (Superb II)”, page 143
- ❑ before installing, check whether both dowel sleeves for centering the balancing shaft module at the cylinder block are present
- ❑ for locking the balancing shafts in the fitting position, use the rig tool - T10255-
- ❑ install new balancing shaft module
  ⇒ “1.11 Installing new balancing shaft module (Superb II)”, page 144
- ❑ Re-install used balancing shaft module that has already been used
  ⇒ “1.12 Installing balancing shaft module that has already been used (Superb II)”, page 147 .

18 - Screws

> **Caution**
>
> *The screws have different diameters and tightening torques:*
>
> *2 screws M7: 13 Nm 90 °*
>
> *4 screws M8: 20 Nm 90 °*

- ❑ Replace after disassembly
- ❑ pay attention to order for slackening ⇒ page 144
- ❑ Pay attention to sequence and procedure when tightening ⇒ page 146

19 - Fitting sleeve

20 - Screw

- ❑ 9 Nm

21 - Intake manifold

22 - Screw

- ❑ 9 Nm

23 - Sealing ring

- ❑ Replace after disassembly

24 - Oil level and oil temperature transmitter - G266-

- ❑ Check ⇒ Vehicle diagnostic tester.
- ❑ Removing and installing
  ⇒ “1.4 Removing and installing oil level and oil temperature sender G266 ”, page 132

25 - Screw

- ❑ Replace after disassembly
- ❑ 9 Nm

26 - Screw

- ❑ Pay attention to sequence for loosening and tightening
  ⇒ “1.7 Removing and installing oil pan”, page 138
- ❑ 13 Nm

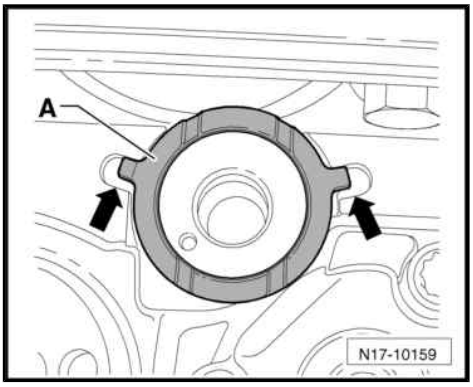
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Fitting position of axial ring

Caution

There is a risk that the axial ring of the intermediate wheel can slip out and will get jammed behind the intermediate wheel.

- *Fix the axial ring -A- on the balancing shaft module with grease in the fitting position. When installing the intermediate wheel, make sure that the axial ring does not slide off through the cut-out of the module for balancing shafts -arrows- and does not jam.*



1.3 Summary of components - oil filter with engine oil cooler

1 - Screw cap

- ❑ with hexagon 32 mm
- ❑ 25 Nm

2 - O-ring

- ❑ Replace after disassembly

3 - O-ring

- ❑ Replace after disassembly

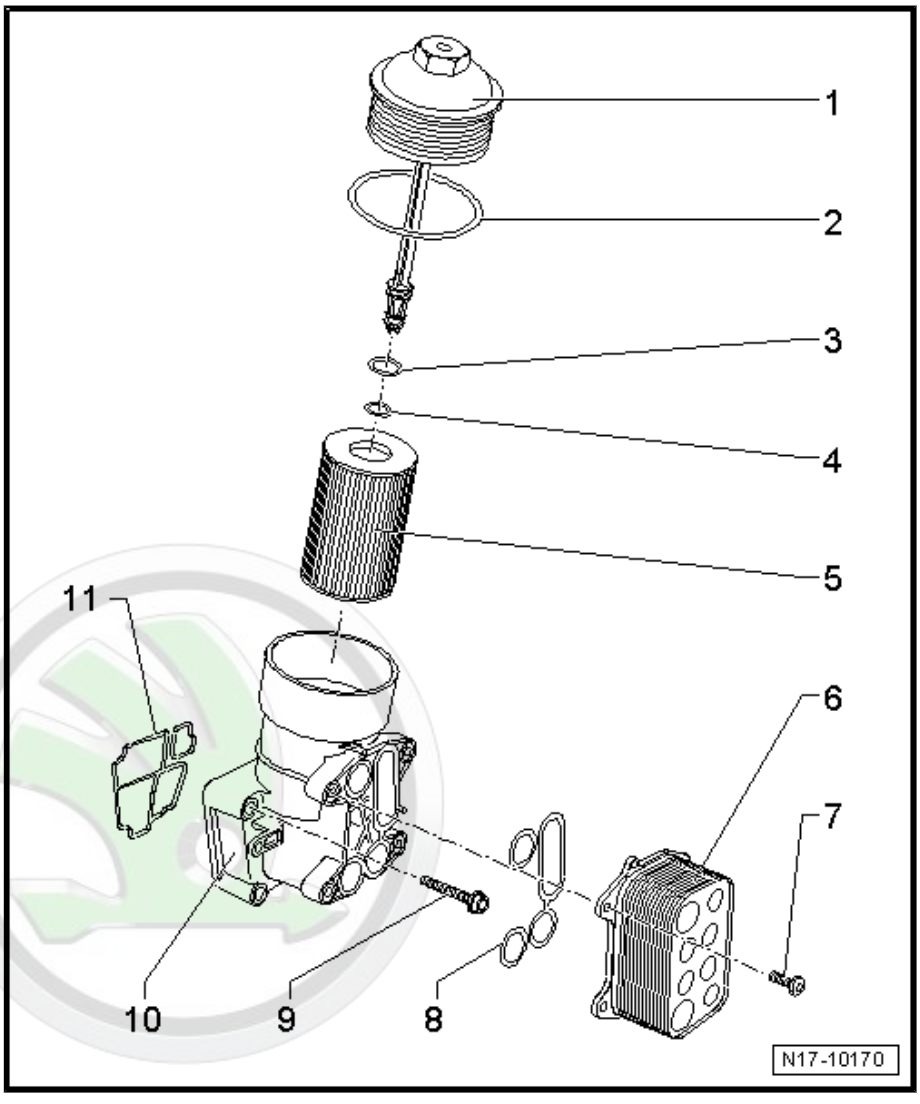
4 - O-ring

- ❑ Replace after disassembly

5 - Oil filter element

- ❑ Pull off from screw cap Pos. -1-
- ❑ when replacing the oil filter element, replace the O-rings Pos. -2-, -3- and -4-
- ❑ Check fitting position
- ❑ Pay attention to change intervals:

- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti



6 - Engine oil cooler

- ❑ with connection of oil and coolant circuit via oil filter holder
- ❑ Removing and installing ⇒ “1.6 Removing and installing engine oil cooler”, page 136
- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

7 - Screw

- ❑ gradually tighten crosswise:

- ♦ Level 1: only by hand
- ♦ Level 2: 5 Nm

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- Level 3: 11 Nm

8 - Seal

- ❑ to engine oil cooler
- ❑ Replace after disassembly

9 - Screw

- ❑ Replace after disassembly
- ❑ tighten crosswise
- ❑ 14 Nm + 90°

10 - Mounting bracket

- ❑ for oil filter and engine oil cooler
- ❑ with integrated connection to the engine, lubrication and cooling system for the engine oil cooler
- ❑ Removing and installing
  ⇒ “1.5 Removing and installing the oil filter holder with the engine oil cooler”, page 133

11 - Seal

- ❑ to cylinder block
- ❑ Replace after disassembly

Note

- *The oil pressure switch - F1- is located on the cylinder head. Therefore it is listed in the summary of components*
  ⇒ “1.2 Summary of components - cylinder head”, page 89 .
- *Remove and install oil pressure switch - F1-*
  ⇒ “1.14 Removing and installing oil pressure switch F1 ”, page 151 .
- *Test oil pressure switch - F1-*
  ⇒ “1.15 Testing oil pressure switch F1 and oil pressure”, page 152 .

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1.4 Removing and installing oil level and oil temperature sender - G266-

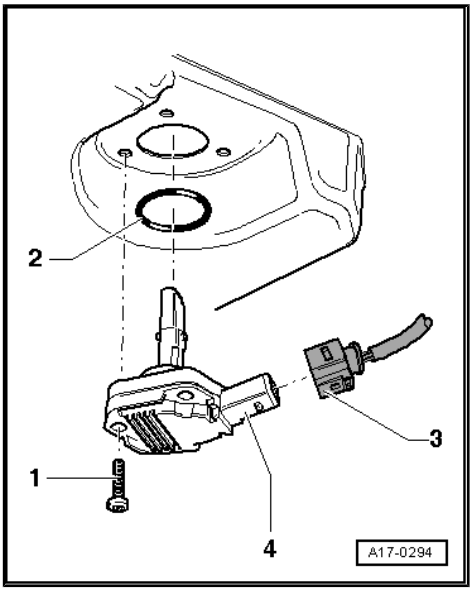
Removing

– Drain engine oil:

- ⇒ Maintenance ; Booklet Octavia II
- ⇒ Maintenance ; Booklet Superb II
- ⇒ Maintenance ; Booklet Yeti

– Disconnect plug connection -3-.

– Unscrew screw -1- and remove oil level and oil temperature sender - G266- -4-.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Replace gasket ring -2- and screws -1-.

– Top up with engine oil and check the oil level:

- ⇒ Maintenance ; Booklet Octavia II
- ⇒ Maintenance ; Booklet Superb II
- ⇒ Maintenance ; Booklet Yeti

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

Screw for oil level and oil temperature sender - G266- :

- Octavia II, Yeti
  ⇒ “1.1 Summary of components - lubrication system (Octavia II, Yeti)”, page 126 .
- Superb II
  ⇒ “1.2 Summary of components - lubrication system (Superb II)”, page 128 .

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1.5 Removing and installing the oil filter holder with the engine oil cooler

Special tools and workshop equipment required

- Removal tool for inner lining of the door panel - MP8-602/1-
- Catch pan , e.g. -VAS 6208-
- Old oil collecting and suction equipment , e.g. -V.A.G 1782-
- Pliers for spring-type clips

Removing

– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

– Removing fan shroud
⇒ “3 Radiator and radiator fan”, page 172 .

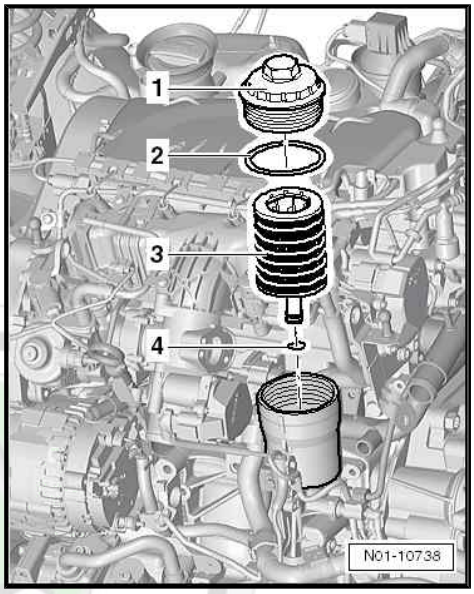
– Remove air filter
⇒ “3.6 Removing and installing air filter”, page 309 .

– Remove oil filter insert -3-:

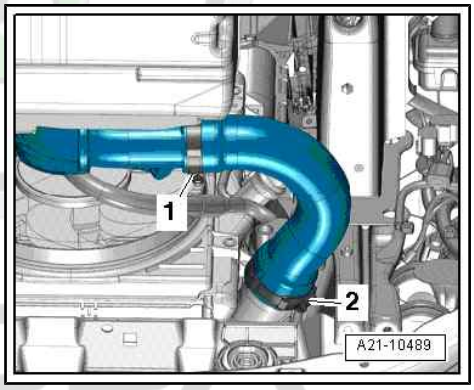
♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

♦ ⇒ Maintenance ; Booklet Yeti



– Remove the charge air hose, to do so slacken the hose clamps -1- and -2-.

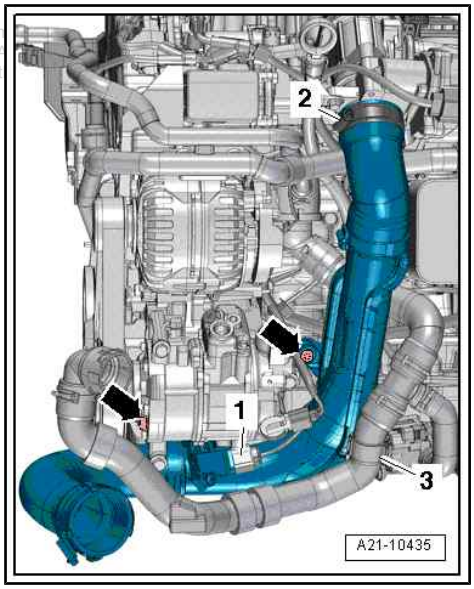


– Remove screws -arrows-.

– Detach coolant hose -3-.

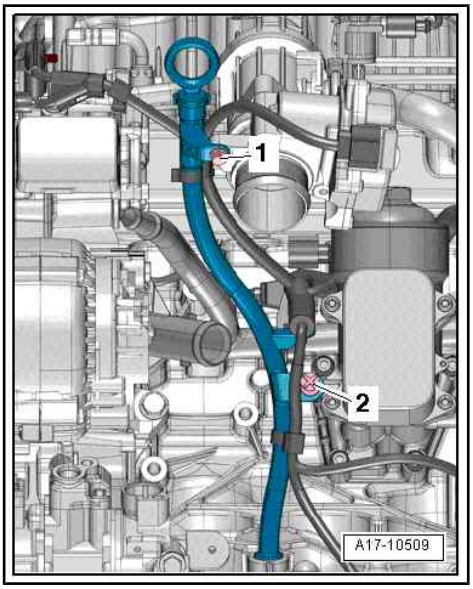
– Loosen hose clamp -2-.

– Disconnect the plug -1- at the charge pressure sender - G31- with intake air temperature sender - G42- and remove the right charge air pipe.



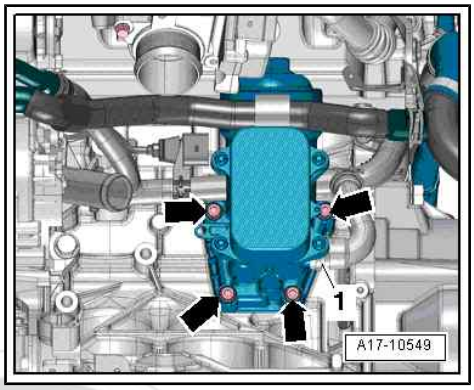
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– Slightly pull out oil dipstick, unscrew screw -1-.
– Press off clip -2- with removal tool - MP8-602/1- .
– Pull out the oil dipstick guide pipe upwards out of the cylinder block and push it to the side.
– Position the catch pan , e.g. -VAS 6208- , under the engine.



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– Slacken hose clamp -1- and detach the coolant return hose from the oil filter holder.
– Place an old oil collecting and suction equipment - V.A.G 1782- under the engine.
– Screw out screws -arrows- and remove oil filter holder and engine oil cooler.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Replace all the gaskets and O-rings.*
- *Hose connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.*
- *Secure all hose connections with screw clamps*
  ⇒ *“2.3 Hose connections with screw clamps”, page 257* .

– Install the oil dipstick guide pipe.
– Install the right charge air pipe
  ⇒ “2.1 Summary of components - charge air cooler (Octavia II, Yeti)”, page 255 , if necessary
  ⇒ “2.2 Summary of components - charge air cooler (Superb II)”, page 256 .
– Install air filter
  ⇒ “3.6 Removing and installing air filter”, page 309 .
– Install fan shroud ⇒ “3 Radiator and radiator fan”, page 172 .
– Install oil filter insert, fill with engine oil and check the oil level:

- ⇒ Maintenance ; Booklet Octavia II
- ⇒ Maintenance ; Booklet Superb II
- ⇒ Maintenance ; Booklet Yeti

– Top up coolant
  ⇒ “1.3 Draining and filling coolant”, page 160 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Screws for oil filter bracket
  ⇒ “1.3 Summary of components - oil filter with engine oil cooler”, page 131 .

1.6 Removing and installing engine oil cooler

Special tools and workshop equipment required

- Catch pan , e.g. -VAS 6208-
- Old oil collecting and suction equipment , e.g. -V.A.G 1782-

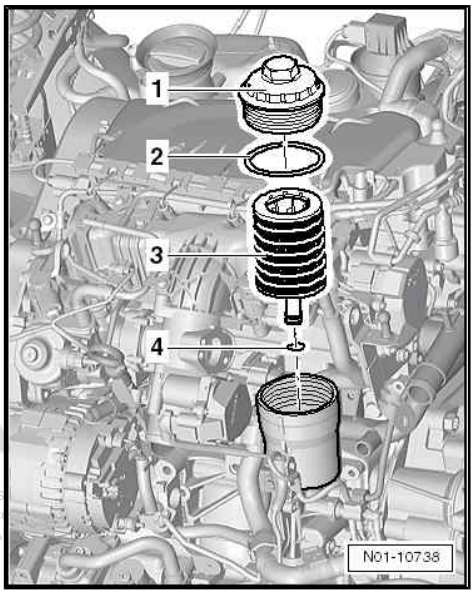
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Removing

– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

– Remove air filter
⇒ “3.6 Removing and installing air filter”, page 309 .

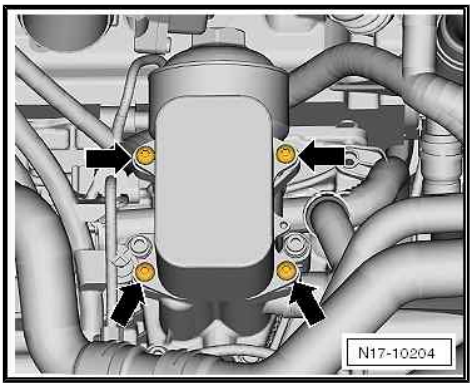
– Remove oil filter insert -3-.



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– Remove screws -arrows-.

– Remove engine oil cooler from oil filter holder.



Installing

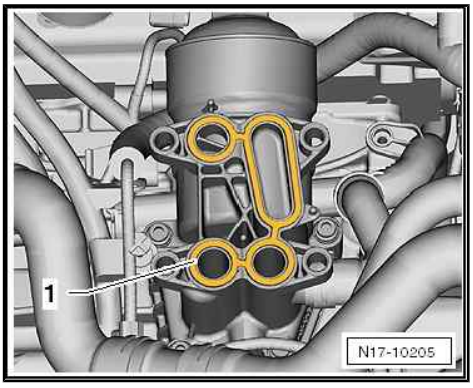
Assembly is carried out in the reverse order. When installing, observe the following:

Note

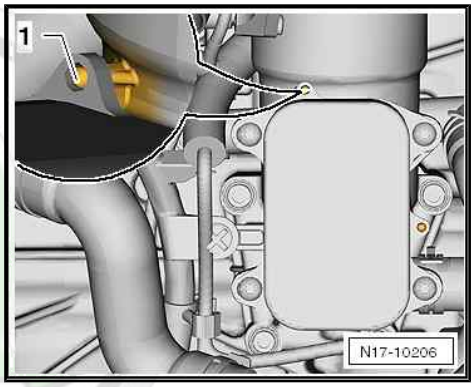
- *Replace all the gaskets and O-rings.*
- *Hose connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.*
- *Observe the mounting sequence for hose connections with screw clamps*
⇒ “2.3 Hose connections with screw clamps”, page 257 .

– Insert the new gasket -1- in the grooves at the oil filter holder.

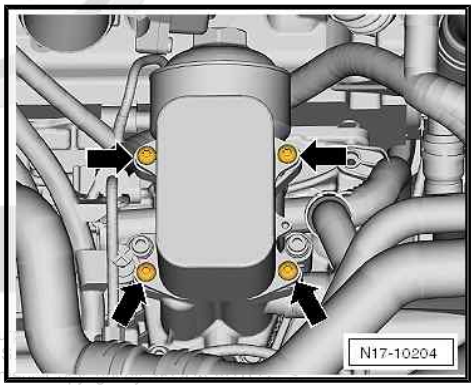
– Carefully position the engine oil cooler onto the dowel sleeves.



– Press in the engine oil cooler at the flange of the oil filter holder in such a way that it rests on the complete surface and the extremities of the dowel pins -1- protrude out of the openings of the guide.



– Insert screws -arrows-, first of all screw in by hand up to the stop, then gradually tighten crosswise.



– Install oil filter insert, fill with engine oil and check the oil level:

♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

♦ ⇒ Maintenance ; Booklet Yeti

Note

If the engine oil cooler was replaced, refill the entire system with coolant.

– Top up with coolant, if necessary replace
⇒ “1.3 Draining and filling coolant”, page 160 .

Tightening torques - summaries of components

♦ Screws for oil filter cooler
⇒ “1.3 Summary of components - oil filter with engine oil cooler”, page 131 .

1.7 Removing and installing oil pan

Special tools and workshop equipment required

♦ Socket - T10058-

♦ Old oil collecting and suction equipment , e.g. -V.A.G 1782-

♦ Silicone sealant ⇒ ETKA - Electronic catalogue of original parts

♦ Sealant remover Gasket Stripper (stock code GST, stock item No. R 34402), manufacturer Retech s.r.o.

♦ Cleaning and degreasing agent , e.g. -D 009 401 04-

♦ Protective goggles and gloves

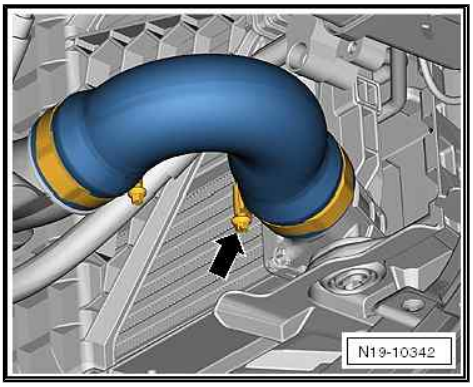
Removing

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

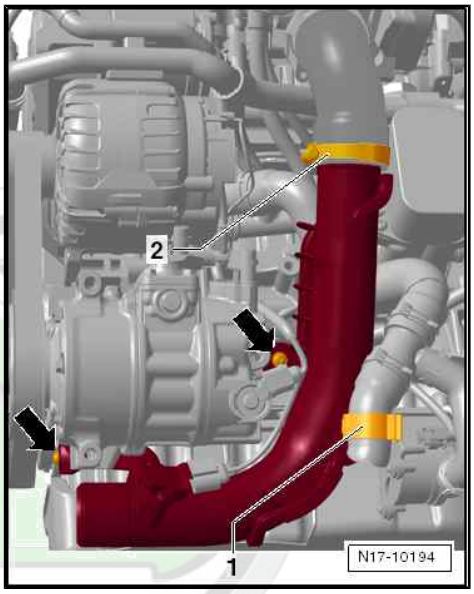
– Remove the right wheelhouse liner bottom part ⇒ Body Work; Rep. gr. 66 .

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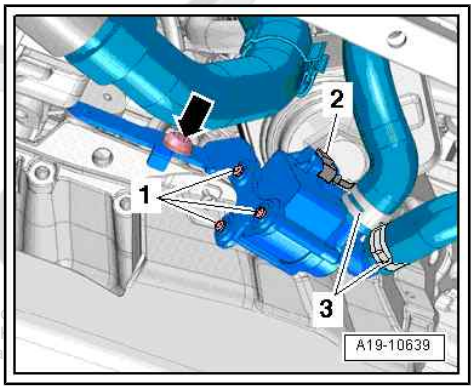
– Remove right charge air hose.



– Unscrew screws -arrows-, push the right charge air pipe slightly to the side and secure.

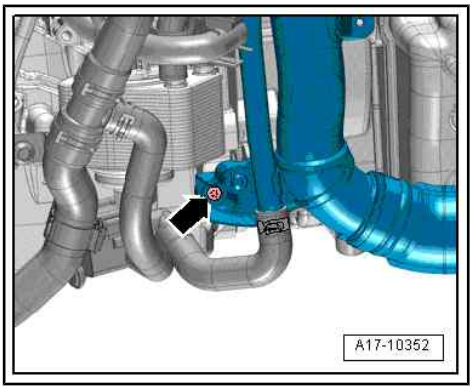


– Unscrew screw -arrow- and push the coolant recirculation pump 2 - V178- to the side.



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– Unscrew screw -arrow- on the left charge air pipe.
– Disconnect plug from oil level and oil temperature sender - G266- .



– Remove noise insulation of oil pan, to do so slacken the fixing parts -arrows-.

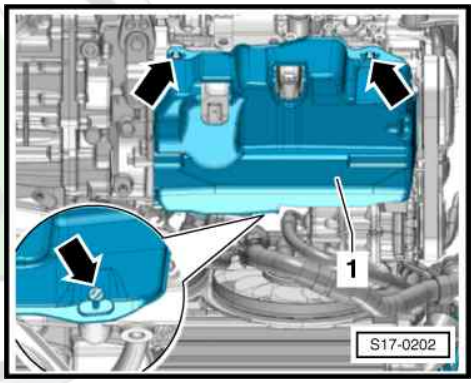
  Front: 1x clip, 2-part
  Rear: 2x screw clip, 2-part

– Suction off engine oil -V.A.G 1782- with old oil collecting and suction equipment:

♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

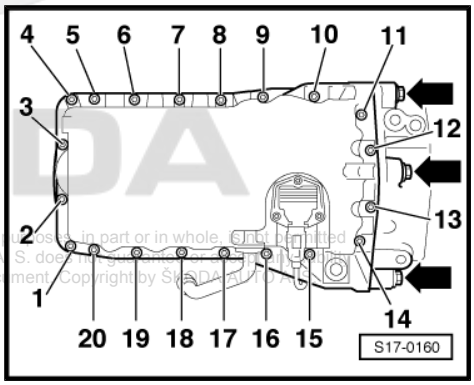
♦ ⇒ Maintenance ; Booklet Yeti



– Unscrew connecting screws of oil pan/gearbox -arrows-.

– Loosen bolts -1...20- crosswise and release.

– Remove oil pan, if necessary release by applying slight blows with a rubber-headed hammer.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

WARNING

Wear protective gloves and goggles when working with gasket remover and degreasing agent!

– Remove residual sealant from the sealing surfaces on the cylinder block and on the oil pan with chemical sealant remover.

– Degrease the sealing surfaces.

– Cut off nozzle tube at the front marking (∅ of nozzle approx. 3 mm).

Caution

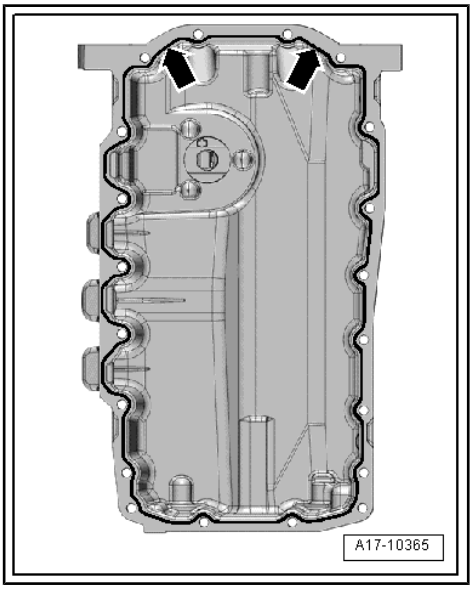
Risk of blockage of the lubrication system through excess sealant.

♦ ***Do not apply a thicker sealant bead than indicated.***

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– Apply silicone sealant bead to the clean sealing surface of the oil pan, as shown -arrows-.

• Thickness of sealant bead: 2-3 mm.



Note

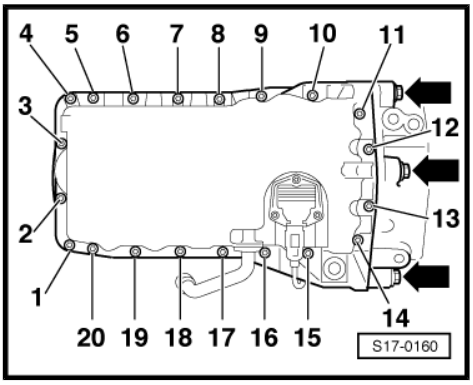
♦ *The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*

♦ *Take particular care when applying the sealant bead in the area of the sealing flange on the gearbox side -arrows-.*

♦ *The oil pan must be installed within 5 minutes after applying the silicone sealant .*

– Fit on oil pan and tighten the screws as follows:

1. Tighten screws -1...20- crosswise to 5 Nm.
2. Tighten the connecting screws of the oil pan/gearbox -arrows- to 40 Nm.



Note

When installing the oil pan on a removed engine, this work step is not carried out. Make sure however that the pan is flush with the cylinder block on the flywheel side.

3. Tighten screws -1...20- crosswise to 13 Nm.

Note

Let sealant dry for approx. 30 minutes after installing oil sump. Only then fill with engine oil.

– Fill with engine oil and check the oil level:

♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

♦ ⇒ Maintenance ; Booklet Yeti

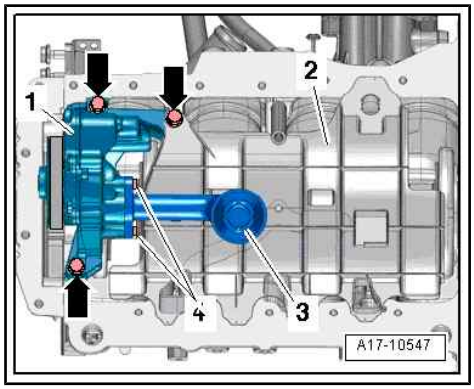
1.8 Removing and installing oil pump (Octavia II, Yeti)

Removing

– Removing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

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– Release screws -4- and remove oil suction pipe -3-.
– Release screws -arrows- and remove baffle -2-.
– Unhook the oil pump -1- from the toothed belt and remove it.



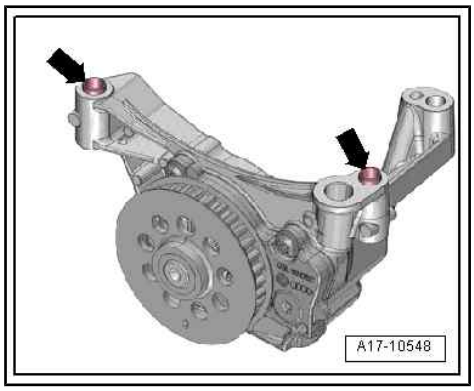
Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Renew O-ring.

– Check the dowel sleeves at the oil pump housing -arrows- for centering the oil pump, insert the dowel sleeves if they are not present.
– Check smooth operation of oil pump, to do so turn the toothed belt sprocket with a finger.



Note

A sluggish oil pump must be replaced.

– Check toothed belt for oil pump.

Note

- *Replace damaged toothed belt.*
- *After long duration the toothed belt can sag, this is not a fault.*

– Hook the oil pump with the toothed belt sprocket into the toothed belt and tighten together with the baffle.
– Installing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

1.9 Removing and installing oil pump (Superb II)

Removing

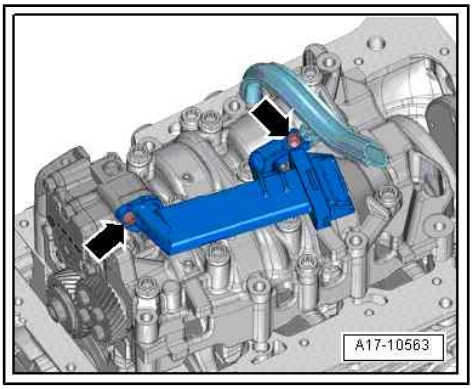
– Removing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

Caution

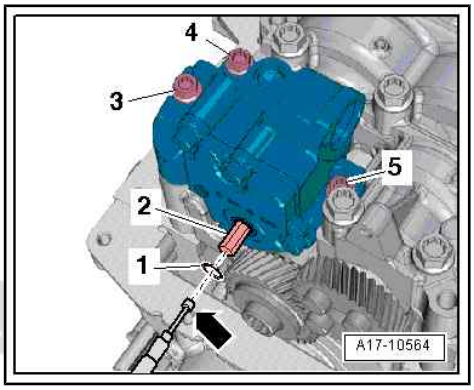
The screw at intermediate wheel must not be released.

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– Unscrew screws -arrows- and detach the intake manifold from the oil pump.



– Remove circlip -1- with circlip pliers.
– Pull the drive shaft -2- with magnet -arrow- out of the oil pump.
– Unscrew screws -3-, -4- and -5- and remove oil pump.



Installing

Installation is performed in the reverse order, pay attention to the following points:

Note

- *Renew O-ring.*
- *Replace damaged or over-extended circlip.*
- *The circlip must be positioned in the base of the groove.*

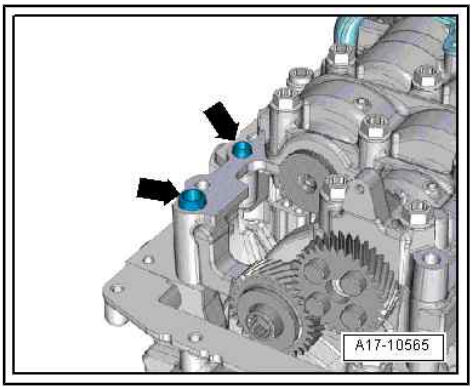
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– Check oil pump for smooth operation.

Note

A sluggish oil pump must be replaced.

– Check the dowel sleeves at the balancing shaft module -arrows- for centering the oil pump, insert the dowel sleeves if they are not present.



– Installing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

1.10 Removing and installing balancing shaft module (Superb II)

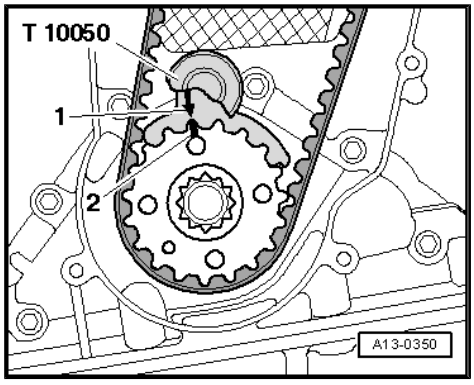
Special tools and workshop equipment required

- Crankshaft arrester - T10050-

– Remove V-ribbed belt pulley from crankshaft
⇒ “1.2 Assembly overview - toothed belt drive”, page 42 .

– Rotate the crankshaft on TDC for cylinder 1 in direction of rotation of the engine and interlock with the crankshaft arrester - T10050- .

• The markings on the toothed belt sprocket of the crankshaft -2- and on the crankshaft arrester - T10050- -1- must be aligned. While doing so, the stud of the crankshaft arrester - T10050- must engage in the hole of the sealing flange on the belt pulley side.

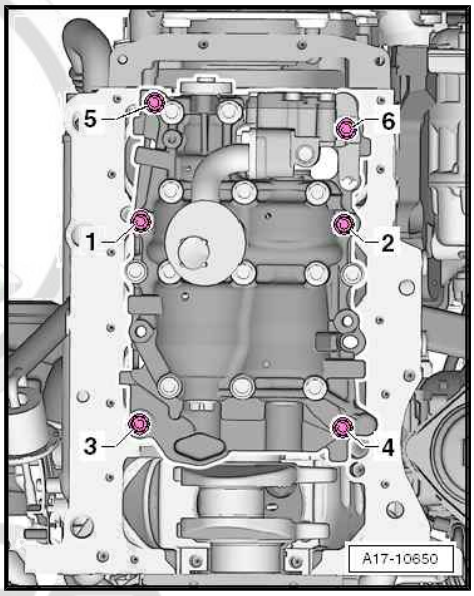


Note

The crankshaft arrester - T10050- can only be fitted onto the crankshaft - toothed belt sprocket from the front side of the serration.

– Removing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

– Release screws in the sequence -6 … 1- and remove balancing shaft module with oil pump.



Note

♦ *Install new balancing shaft module*
⇒ “1.11 Installing new balancing shaft module (Superb II)”, page 144 .

♦ *Re-install the already used balancing shaft module*
⇒ “1.12 Installing balancing shaft module that has already been used (Superb II)”, page 147 .

1.11 Installing new balancing shaft module (Superb II)

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Special tools and workshop equipment required

♦ Counterholder - T10255-

♦ Crankshaft arrester - T10050-

Note

- *The gear wheels for the drive of the balancing shafts and the oil pump must have an operating tooth flank clearance of 0.038 .. 0.072 mm after running-in.*
- *In order to reach the correct tooth flank clearance, the coating on the tooth flanks of the new intermediate wheel must have a special thickness, so that after their quick removal, the gearbox has a correct tooth clearance when the engine is running for a short period of time.*
- *Always mount the new balancing shaft module with a new intermediate wheel with undamaged coating and do not set the tooth flank clearance while installing.*
- *Replace screws which have been tightened to a torquing angle.*

- The crankshaft is interlocked with the crankshaft arrester - T10050- at TDC for cylinder 1.

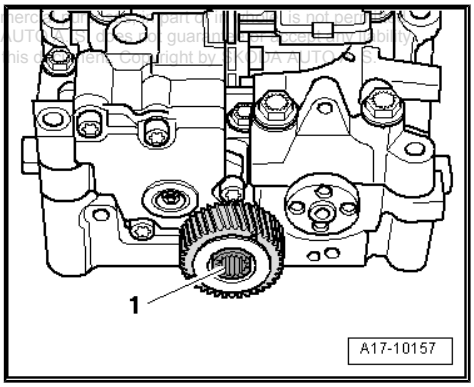
Caution

There is the risk that the axial ring slides off behind the intermediate wheel! Do not loosen the screw for the intermediate wheel more than specified in order to insert the balancing shaft module.

Fitting position of axial ring ***⇒ page 131*** ***.***

– Loosen screw -1- of the new intermediate wheel by approx. 90°.

– Check the presence of both dowel sleeves for the correct position of the balancing shaft module on the cylinder block.



Note

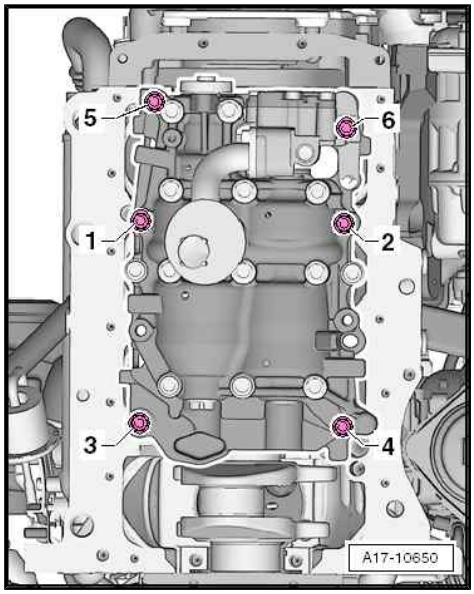
Ensure that the coating of the new intermediate wheel is not damaged.

– Position the new balancing shaft module on the cylinder block, while doing so pay attention to the position of the intermediate wheel to the crankshaft drive pinion.

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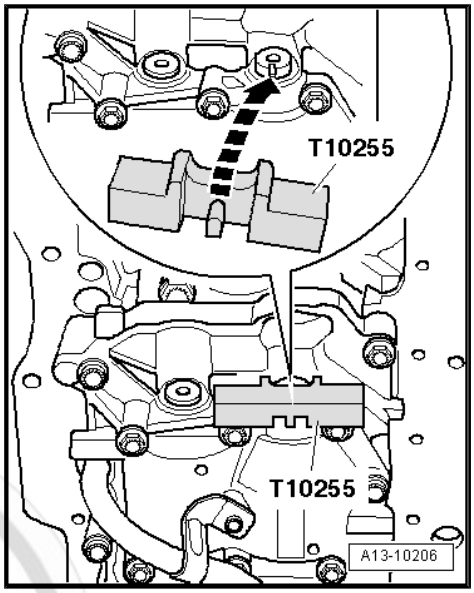
– Insert new screws -1 ... 6- and first of all screw in by hand.
– Tighten screws of balancing shaft module as follows:

1. Pre-tighten the screws in the sequence -1 ... 6- to 6 Nm.
2. Tighten screws -5- and -6- to 13 Nm.
3. Tighten screws -1 … 4- to 20 Nm.
4. Torque screws in the sequence -1 ... 6- a further 90° using a rigid wrench.



– Interlock the balancing shaft in the fitting position using the rig tool - T10255- or turn the balancing shaft.

• The stud of the rig tool must grip into the groove of the balancing shaft.

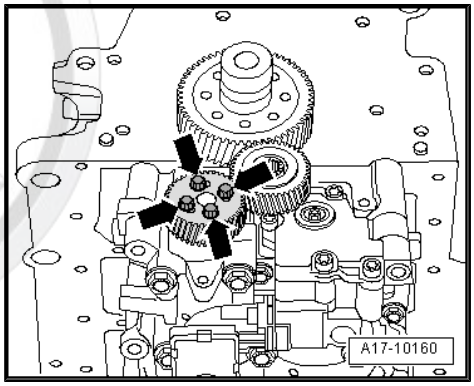


Note

♦ *Fit the gear wheel of the balancing shaft on the balancing shaft with utmost care. While doing so, ensure that the coating of the intermediate wheel is not damaged.*

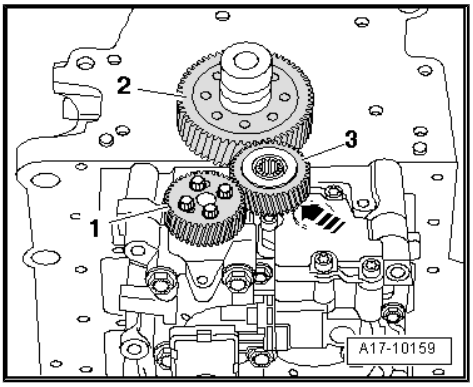
♦ *If the oblong holes in the pinion are not aligned with the threaded bores of the flange for the balancing shaft when positioning on the balancing shaft, the pinion must be removed and turned further by the corresponding number of teeth and put on again.*

– Carefully put the pinion onto the balancing shaft, to do so push the intermediate wheel to the side.
– Screw on balancing shaft pinion -arrows- ⇒ “1.2 Summary of components - lubrication system (Superb II)”, page 128 .
– Remove rig tool - T10255- .



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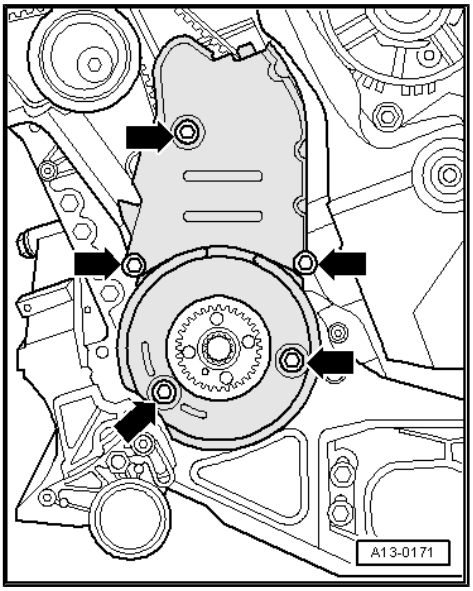
The following 3 work steps must be carried out simultaneously (2nd mechanic is required).



– If necessary forcefully push the intermediate wheel -3- with the aid of a wooden rod in -direction of arrow- into the serration of the crankshaft drive pinion -2- and the balancing shaft pinion -1-.
– While doing so slightly turn the balancing shaft pinion anti-clockwise.
– Tighten screw for intermediate wheel
⇒ “1.2 Summary of components - lubrication system (Superb II)”, page 128 .
– Remove crankshaft arrester - T10050- .

Note

After installing, the new intermediate wheel must not have any noticeable torsional clearance.



– Screw on toothed belt guard - bottom part -arrows-.

Installation is carried out in the reverse order. When installing, note the following:

– Installing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .
– Installing the V-ribbed belt pulley crankshaft
⇒ “1.2 Assembly overview - toothed belt drive”, page 42 .

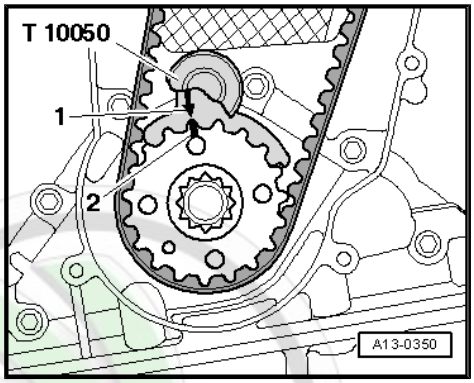
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1.12 Installing balancing shaft module that has already been used (Superb II)

Note

- *If the previously used balancing shaft module is re-installed and neither the crankshaft nor the drive pinion on the crankshaft was replaced, proceed as described below. The screw for the intermediate wheel must on no account be released.*
- *If the screw for intermediate wheel was slackened or the drive pinion on the crankshaft or the crankshaft was replaced, a new intermediate wheel with coating must be installed. Procedure when installing a new intermediate wheel*
⇒ “1.11 Installing new balancing shaft module (Superb II)”, page 144 .
- *Replace screws which have been tightened to a torquing angle.*

- The crankshaft is interlocked with the crankshaft arrester - T10050- at TDC for cylinder 1.



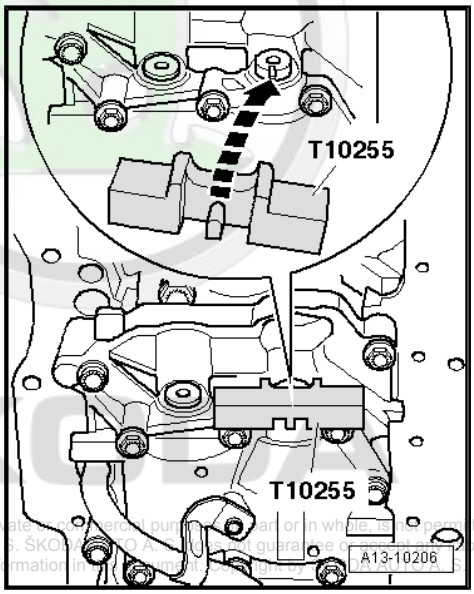
– Interlock the balancing shaft in the fitting position using the rig tool - T10255- or turn the balancing shaft.

- The stud of the rig tool must grip into the groove of the balancing shaft.

– Check the presence of both dowel sleeves for the correct position of the balancing shaft module on the cylinder block.

– Fit the previously used balancing shaft module on the cylinder block.

- When the locked crankshaft and the balancing shaft are in their fitting positions, the intermediate wheel must grip correctly into the crankshaft drive pinion and thus have an easily determined torsional clearance.



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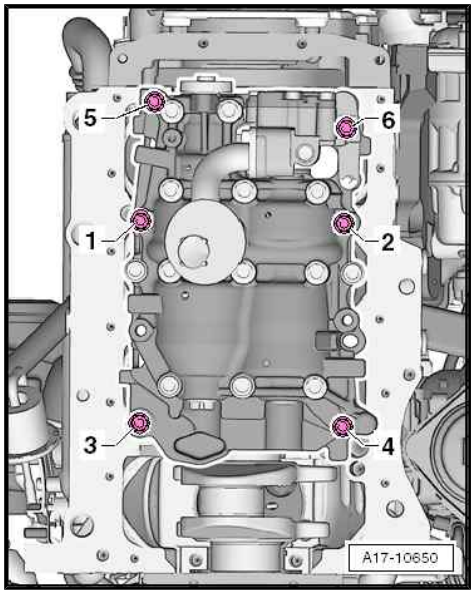
– Insert new screws -1 ... 6- and first of all screw in by hand.

– Tighten screws of balancing shaft module as follows:

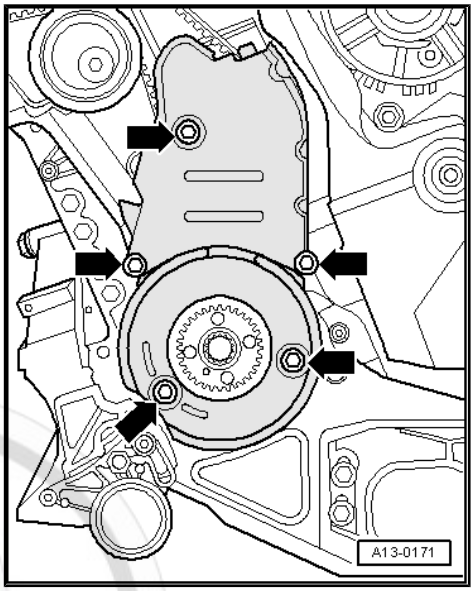
1. Pre-tighten the screws in the sequence -1 ... 6- to 6 Nm.
2. Tighten screws -5- and -6- to 13 Nm.
3. Tighten screws -1 … 4- to 20 Nm.
4. Torque screws in the sequence -1 ... 6- a further 90° using a rigid wrench.

– Remove rig tool - T10255- .

– Remove crankshaft arrester - T10050- .



– Screw on toothed belt guard - bottom part -arrows-.



Installation is carried out in the reverse order. When installing, note the following:

– Installing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

– Installing the V-ribbed belt pulley crankshaft
⇒ “1.2 Assembly overview - toothed belt drive”, page 42 .

1.13 Replacing the crankshaft drive pinion (Superb II)

Special tools and workshop equipment required

- Commercially available heater unit
- Insertion tool - MP1-214 (10-203)-
- Extractor - T10392-
- Thrust piece - T10392/1-
- Multimeter in combination with temperature sender - V.A.G 1526 B-

Removing

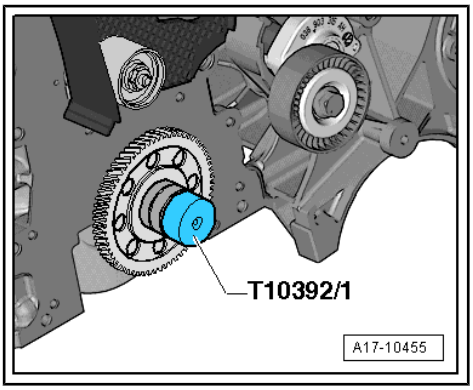
– Remove the sealing flange on the belt pulley side
⇒ “2.4 Removing and installing the sealing flange on the belt pulley side”, page 65 .

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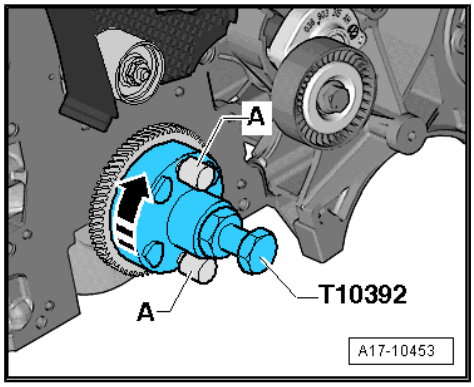
– Removing the oil pan
⇒ “1.7 Removing and installing oil pan”, page 138 .

– Remove balancing shaft module
⇒ “1.10 Removing and installing balancing shaft module (Superb II)”, page 143 .

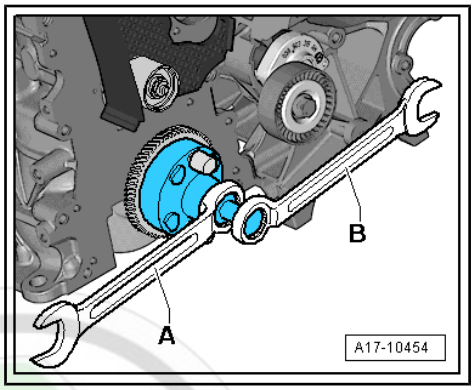
– Position the thrust piece - T10392/1- on the crankshaft.



– Insert the extractor - T10392- into the holes of the drive pinion, turn the extractor in clockwise direction -arrow- and screw in locking pins -A-.



– Detach the drive pinion from the crankshaft journal by tightening the screw of the extractor using the ring spanner -B- or the ratchet; while doing so counterhold the crankshaft with the ring spanner -A-.



Installing

Note

- *Make sure the crankshaft journal and the drive pinion are clean.*
- *Check the temperature when heating up the new drive wheel with the temperature measuring instrument - VAS 6519- or the hand-held multimeter - V.A.G 1526- in combination with the sender - V.A.G 1526D/1- , to do so press the tracing point of the temperature sender at the drive wheel.*
- *When heating the wheel to a temperature of 200 °C, there are approx. 4 seconds available in order to insert the drive pinion on the crankshaft journal.*
- *At a higher temperature, the time for inserting is prolonged; at 220 °C there are approx. 6 seconds available.*

WARNING

The maximum temperature of 240°C must not be exceeded otherwise the drive pinion changes colour or deforms.

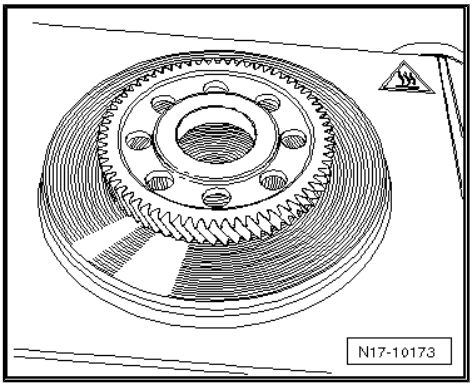
WARNING

Risk of burning. You must wear suitable protective gloves for the further work procedure.

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– Place the new drive pinion with its entire surface onto the commercially available heater unit, the inscription must point to the top.

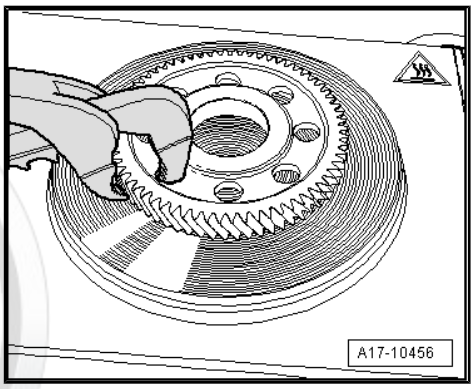
– Heat the drive pinion to minimum 200 °C, but to maximum 240 °C.



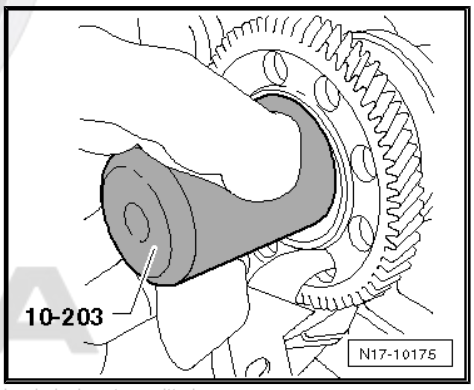
Note

Make sure that the gear tooth system is not damaged.

– Grip the heated drive pinion with pliers after reaching the temperature, as shown in the fig.



– Position the heated drive pinion on the crankshaft journal and without deadlock, immediately push on continuously by hand using the insertion tool - MP1-214 (10-203)- .



– Wait a few minutes until the positioned drive pinion is cold.

– Install the sealing flange on the belt pulley side
⇒ “2.4 Removing and installing the sealing flange on the belt pulley side”, page 65 .

Note

After replacing the crankshaft drive pinion or the crankshaft, the previous balancing shaft module must also be mounted with a new intermediate wheel.

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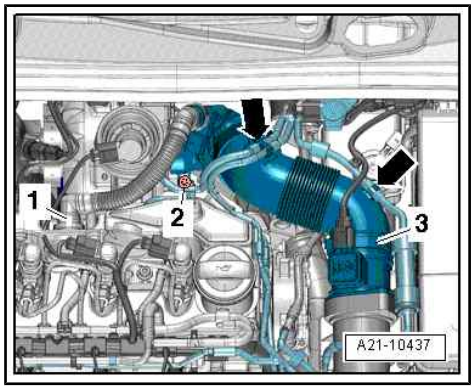
– Install balancing shaft module
⇒ “1.12 Installing balancing shaft module that has already been used (Superb II)”, page 147 .

1.14 Removing and installing oil pressure switch - F1-

Removing

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

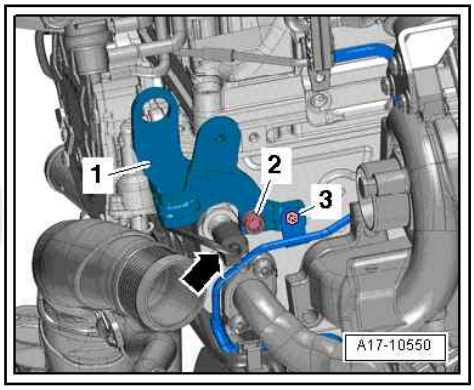
– Remove the hose for the crankcase ventilation -1-, to do so press together the release buttons.
– Release vacuum hoses -arrows-.
– Release hose clamp -3- and separate the intake hose from the air mass meter - G70- .
– Release screw -2-, swivel intake hose with connection fitting towards the rear and detach from exhaust gas turbocharger.



– Unscrew screws -2- and -3- and remove engine lifting eye -1-.
– Unplug connector -arrow-.
– Screw out oil pressure switch - F1- .

Installing

Assembly is carried out in the reverse order. When installing, observe the following:



Note

Replace sealing ring.

– Install vacuum line.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

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♦ Oil pressure switch - F1-
⇒ “1.2 Summary of components - cylinder head”, page 89 .

1.15 Testing oil pressure switch - F1- and oil pressure

⇒ “1.15.1 Test after removal of the oil pressure switch F1 ”, page 153

⇒ “1.15.2 Test without removal of the oil pressure switch F1 ”, page 155

Special tools and workshop equipment required

♦ Oil pressure tester , e.g. -V.A.G 1342-
♦ Voltage tester , e. g. -V.A.G 1527 B-
♦ Auxiliary measuring set, , e. g. -V.A.G 1594 C-

Test conditions

• Oil level o.k.
• Coolant temperature approx. 80°C.

1.15.1 Test after removal of the oil pressure switch - F1-

Note

The test is carried out after removing the oil pressure switch - F1- from the cylinder head.

Test preparations

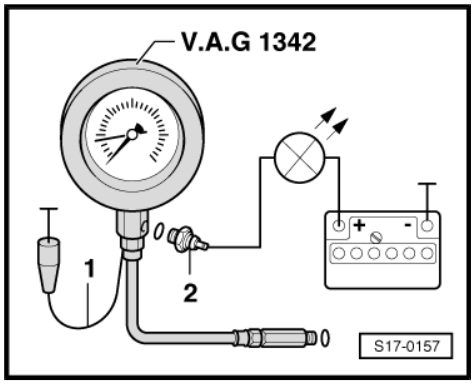
– Remove oil pressure switch - F1-
⇒ “1.14 Removing and installing oil pressure switch F1 ”, page 151 .

– Screw the adapter - V.A.G 1342/19- into the threaded hole for the oil pressure switch if required.

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– Connect the oil pressure testing device - V.A.G 1342- to the hole for oil pressure switch or the adapter - V.A.G 1342/19- .

– Screw the oil pressure switch -2- into the oil pressure tester.



Test oil pressure switch - F1-

– Connect brown cable -1- of oil pressure tester to earth (-).

– Connect the voltage tester with the auxiliary cables from the measuring tool set to the oil pressure switch - F1- and to battery positive (+).

• The LED must not light up.

If the LED lights up:

– Replace oil pressure switch.

Diode does not light up:

– Start engine.

Note

Observe the testing equipment and the LED while actuating the starter since the switching point of the oil pressure switch - F1- can already be reached when starting up.

• At a pressure of 0.03...0.6 MPa (0.3...0.6 bar) the LED should light up.

If the LED does not light up:

– Replace oil pressure switch - F1-
⇒ “1.14 Removing and installing oil pressure switch F1 ”, page 151 .

Testing oil pressure

– Start engine.

• Oil pressure when engine idling: at least 0.08 MPa (0.8 bar).

• Oil pressure at 2000 rpm: min. 0.2 MPa (2.0 bar).

If the specified values are not reached, the oil pump is defective.

– Replace oil pump
⇒ “1.1 Summary of components - lubrication system (Octavia II, Yeti)”, page 126 .

• Oil pressure at a higher engine speed: max. 0.52 MPa (5.2 bar)

If the specified value is exceeded, the pressure control valve in the oil pump is defective.

– Replace oil pump:

◆ Octavia II, Yeti
⇒ “1.8 Removing and installing oil pump (Octavia II, Yeti)”, page 141 .

◆ Superb II
⇒ “1.9 Removing and installing oil pump (Superb II)”, page 142 .

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Note

After testing the oil pressure switch - F1- or checking the oil pressure, remove the oil pressure tester - V.A.G 1342- and reinstall the oil pressure switch - F1- with a new sealing ring
⇒ "1.14 Removing and installing oil pressure switch F1 ", page 151 .

1.15.2 Test without removal of the oil pressure switch - F1-

Note

The oil pressure switch - F1- remains installed and only the screw plug of the oil duct at the left of the cylinder head, which is more easily accessible, is unscrewed.

Test preparations

– Clean the surroundings and unscrew the screw plug of the oil duct at the left of the cylinder head.

– Screw the connection of the oil pressure tester - V.A.G 1342- with positioned gasket into the threaded hole for the screw plug.

– Close the hole for the oil pressure switch in the oil pressure tester by means of the removed screw plug of the oil duct with gasket.

– Disconnect the plug from the oil pressure switch - F1- at the rear of the cylinder head.

Test oil pressure switch - F1-

– Connect the voltage tester with the auxiliary cables from the measuring tool set to the oil pressure switch - F1- at the cylinder head and to battery positive (+).

- The LED must not light up.

If the LED lights up:

– Replace oil pressure switch - F1-
⇒ "1.14 Removing and installing oil pressure switch F1 ", page 151 .

Diode does not light up:

– Start engine.

Note

Observe the testing equipment and the LED while actuating the starter since the switching point of the oil pressure switch - F1- can already be reached when starting up.

- At a pressure of 0.03...0.6 MPa (0.3...0.6 bar) the LED should light up.

If the LED does not light up:

– Replace oil pressure switch - F1-
⇒ "1.14 Removing and installing oil pressure switch F1 ", page 151 .

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Testing oil pressure

– Start engine.

- Oil pressure when engine idling: at least 0,08 MPa (0,8 bar)
- Oil pressure at 2000 rpm: min. 0.14 MPa (1.4 bar)

If the specified values are not reached, the oil pump is defective.

– Replace oil pump:

◆ Octavia II, Yeti
⇒ “1.8 Removing and installing oil pump (Octavia II, Yeti)”, page 141 .

◆ Superb II
⇒ “1.9 Removing and installing oil pump (Superb II)”, page 142 .

- Oil pressure at a higher engine speed: max. 0.52 MPa (5.2 bar)

If the specified value is exceeded, the pressure control valve in the oil pump is defective.

– Replace oil pump:

◆ Octavia II, Yeti
⇒ “1.8 Removing and installing oil pump (Octavia II, Yeti)”, page 141 .

◆ Superb II
⇒ “1.9 Removing and installing oil pump (Superb II)”, page 142 .

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Note

◆ *After testing the oil pressure switch - F1- or after checking the oil pressure, remove the oil pressure tester - V.A.G 1342- and install the screw plug of the oil duct with a new gasket ring.*

◆ *Tightening torque of plug is 14 Nm.*

19 – Cooling

1 Cooling system

⇒ “1.1 Summary of components - Parts of cooling system engine side”, page 157

⇒ “1.2 Connection diagram for coolant hoses”, page 159

⇒ “1.3 Draining and filling coolant”, page 160

⇒ “1.4 Remove and install coolant recirculation pump 2 V178 ”, page 163

⇒ “1.5 Replace coolant temperature sender G62 ”, page 164

⇒ “1.6 Replace coolant temperature sender at radiator outlet G83 ”, page 165

1.1 Summary of components - Parts of cooling system engine side

1 - Grommet
- ❑ not available separately

2 - Bushing
- ❑ not available separately

3 - Screw
- ❑ 3 Nm

4 - Screw
- ❑ 40 Nm

5 - Mounting bracket
- ❑ Coolant recirculation pump 2 - V178-

6 - Coolant pipe - front

7 - O-ring
- ❑ Replace after disassembly

8 - Screw
- ❑ 8 Nm

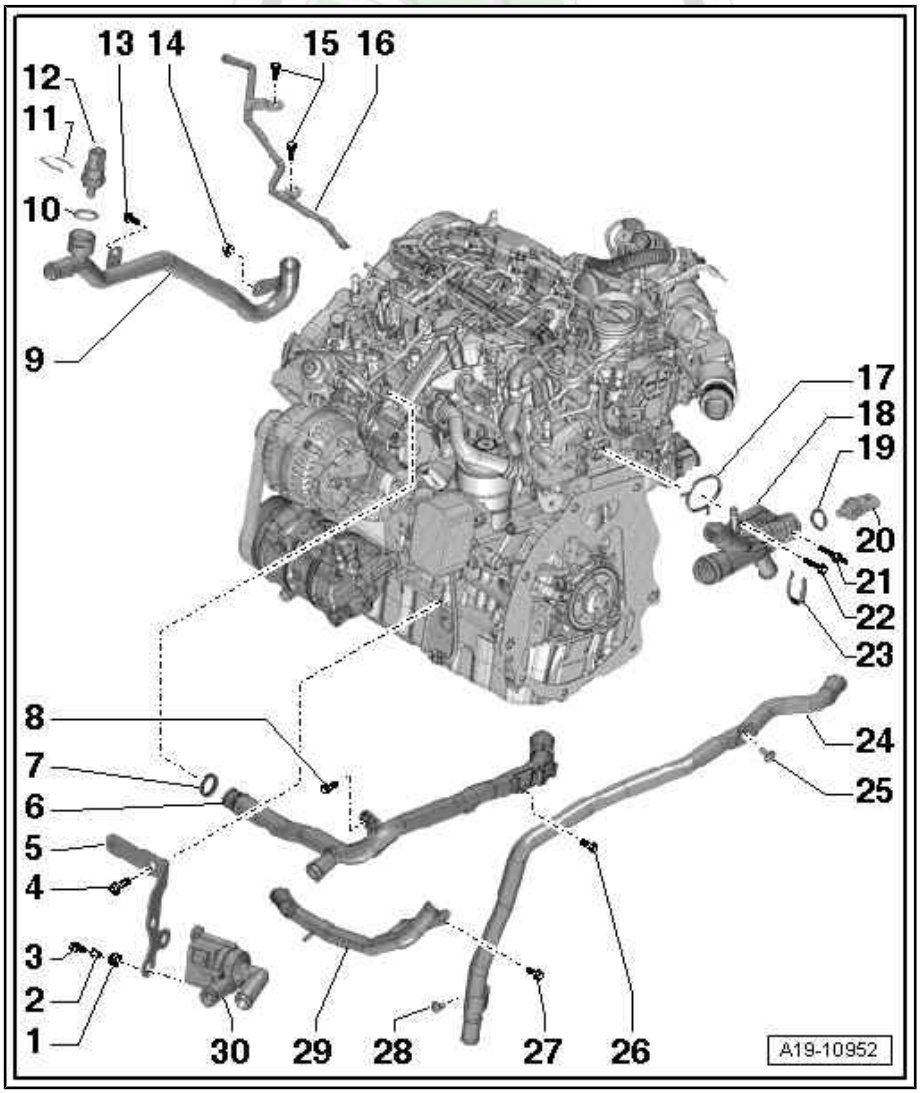
9 - Coolant pipe - right

10 - O-ring
- ❑ Replace after disassembly

11 - Retaining clip
- ❑ check correct fitting

12 - Coolant temperature sender at radiator outlet - G83-
- ❑ Replace ⇒ “1.6 Replace coolant temperature sender at radiator outlet G83 ”, page 165

13 - Screw
- ❑ 9 Nm



14 - Nut

- ❑ 9 Nm

15 - Screw

- ❑ 9 Nm

16 - Coolant pipe - top

17 - Seal

- ❑ Replace after disassembly

18 - Connection fitting

- ❑ for cylinder head

19 - O-ring

- ❑ Replace after disassembly

20 - Coolant temperature sender -G62-

- ❑ Replace ⇒ “1.5 Replace coolant temperature sender G62 ”, page 164

21 - Double screw

- ❑ 9 Nm

22 - Screw

- ❑ 9 Nm

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23 - Retaining clip

- ❑ check correct fitting

24 - Coolant pipe - left

25 - Screw

- ❑ 9 Nm

26 - Screw

- ❑ 9 Nm

27 - Screw

- ❑ 9 Nm

28 - Screw

- ❑ 13 Nm

29 - Coolant pipe - front top

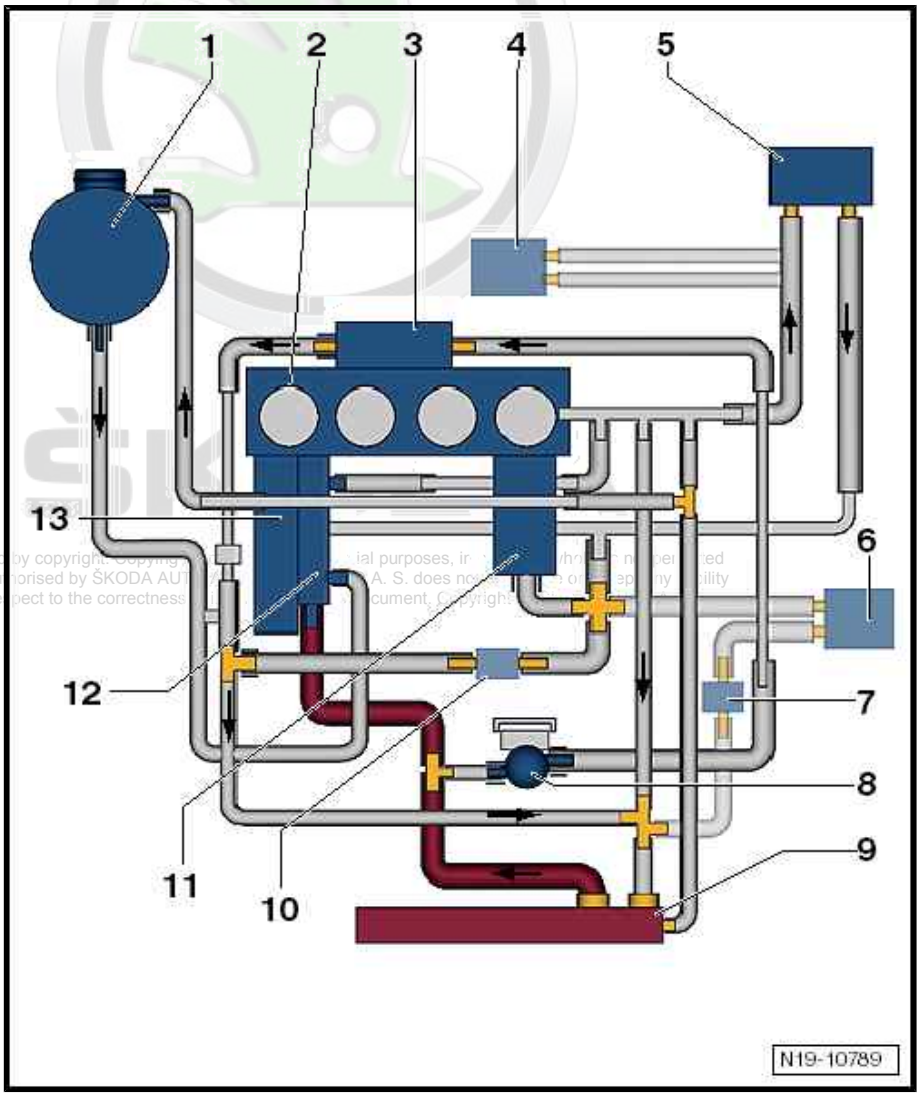
30 - Coolant recirculation pump 2 - V178-

Note

After replacing, it is absolutely necessary to bleed the cooling system with the filling device - VAS 6096- . ⇒ “1.3 Draining and filling coolant”, page 160 . Otherwise, the air bubbles can cause consequential damage to the radiator for exhaust gas recirculation through overheating.

- ❑ Removing and installing ⇒ “1.4 Remove and install coolant recirculation pump 2 V178 ”, page 163

1.2 Connection diagram for coolant hoses



1 - expansion reservoir

- ❑ with cap
- ❑ Test the pressure valve in the cap ⇒ “3.5 Check cooling system for leaks”, page 179

2 - Cylinder head and cylinder block

- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

3 - Radiator for exhaust gas recirculation

- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160
- ❑ Testing exhaust gas recirculation for leaktightness ⇒ “2.2 Test air-tightness of the radiator for exhaust gas recirculation”, page 344
- ❑ Removing and installing ⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348

4 - Auxiliary heating

- ❑ with circulating pump - V55-
- ❑ must not be installed

5 - Heat exchanger for heating

- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

6 - Gearbox oil cooler

- ❑ only on vehicles with automatic gearbox
- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

7 - Coolant regulator

- ❑ only on vehicles with automatic gearbox

8 - Coolant recirculation pump 2 - V178-

Note

After replacing, it is absolutely necessary to bleed the cooling system with the filling device - VAS 6096- . ⇒ “1.3 Draining and filling coolant”, page 160 . Otherwise, the air bubbles can cause consequential damage to the radiator for exhaust gas recirculation through overheating.

- ❑ Removing and installing ⇒ “1.4 Remove and install coolant recirculation pump 2 V178 ”, page 163

9 - Coolant radiator

- ❑ Removing and installing ⇒ “3.4 Removing and installing radiator”, page 177
- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

10 - Coolant regulator

- ❑ must not be installed

11 - Engine oil cooler

- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160
- ❑ Removing and installing ⇒ “1.6 Removing and installing engine oil cooler”, page 136

12 - 4/2 way valve with coolant regulator

- ❑ Removing and installing
  ⇒ “2.3 Removing and installing 4/2 way valve with coolant regulator”, page 168

13 - Coolant pump

- ❑ Removing and installing ⇒ “2.2 Removing and installing coolant pump”, page 167

1.3 Draining and filling coolant

Special tools and workshop equipment required

- ♦ Catch pan , e.g. -VAS 6208-
- ♦ Pliers for spring-type clips
- ♦ Refractometer
- ♦ Cooling system charge unit - VAS 6096-
- ♦ Adapter - V.A.G 1274/8-

Draining

Note

- ♦ *Collect and dispose of drained coolant in a clean container.*
- ♦ *Observe the disposal instructions.*

WARNING

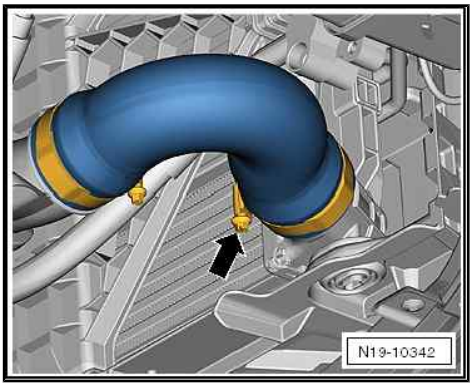
When opening the expansion reservoir, out hot steam or hot coolant may escape. Cover the cap with a cloth and open carefully.

– Open the cap of the coolant expansion reservoir.

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

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– Remove right charge air hose.

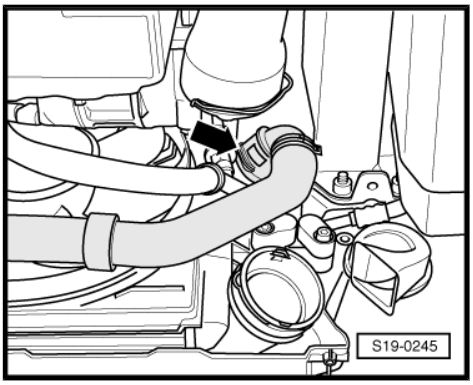


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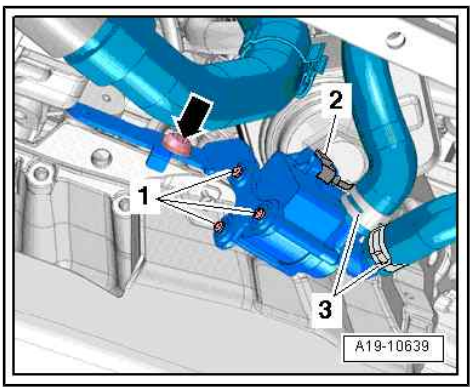
Shut off the opening of the charge air cooler, e.g. with a clean foam piece, so that no coolant can penetrate.

– Place a catch pan under the engine.

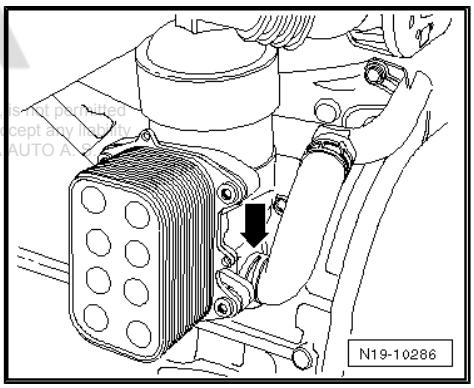
– Remove the right coolant hose from the radiator; to do so pull the retaining clip -arrow-.



– Detach the coolant hoses -3- from the coolant recirculation pump 2 - V178- .



– Remove the coolant hose from the oil filter holder -arrow- and drain residual coolant.



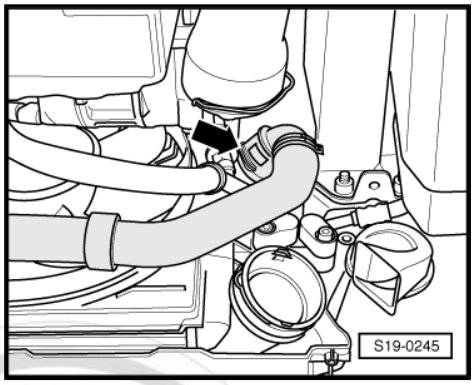
Filling up

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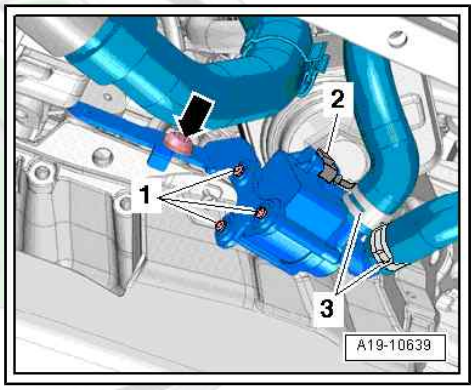
Note

Replace O-rings.

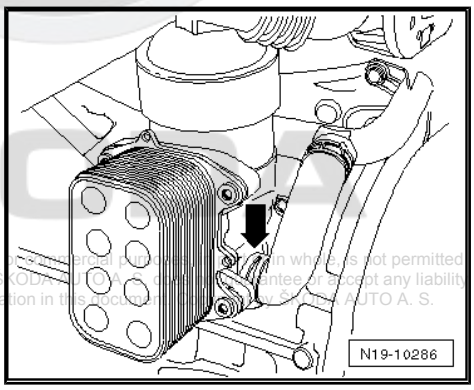
– Connect right coolant hose at radiator -arrow-.



– Connect the coolant hoses -3- at the coolant recirculation pump 2 - V178- .



– Connect coolant hose at oil filter holder -arrow-.



Note

The cooling system is filled all year round with a mixture of distilled water and coolant additive with anti-corrosion agent.

Select the appropriate coolant additive from the ⇒ ETKA - Electronic catalogue of original parts .

– In a clean reservoir, mix distilled water and coolant additive in the specified mixing ratio:

♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

♦ ⇒ Maintenance ; Booklet Yeti

With cooling system charge unit - VAS 6096-

– Screw the adapter - V.A.G 1274/8- onto the compensation bottle.

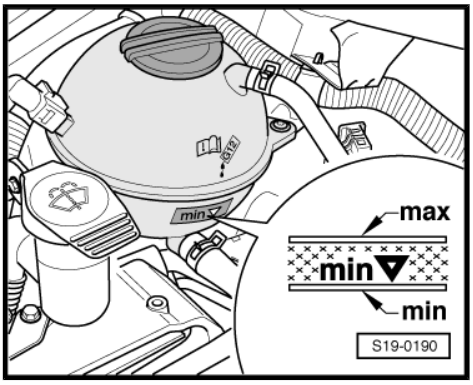
– Top up the cooling system using the cooling system charge unit - VAS 6096- ⇒ Operating instructions of the cooling system charge unit -VAS 6096- .

Without cooling system charge unit - VAS 6096-

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– Top up coolant through the connection of the expansion tank, until the “max.” marking of the coolant level is reached.

– Switch off the heating, and if present, the air conditioning system as well.



Continued for all engines

– Start engine, run for not more than 2 minutes at approx. 1500 rpm and while doing so continuously top up coolant in the expansion reservoir.

– Seal expansion reservoir.

– Run engine until radiator fan starts.

WARNING

When opening the expansion reservoir, out hot steam or hot coolant may escape. Cover the cap with a cloth and open carefully. Wear safety goggles and safety clothing to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.

– Check the coolant level when the expansion tank is closed and top up if necessary when the engine is cooled down.

• When engine is at operating temperature the coolant level must be at the maximum marking, when engine is cold between the minimum and the maximum markings.

1.4 Remove and install coolant recirculation pump 2 - V178-

Special tools and workshop equipment required

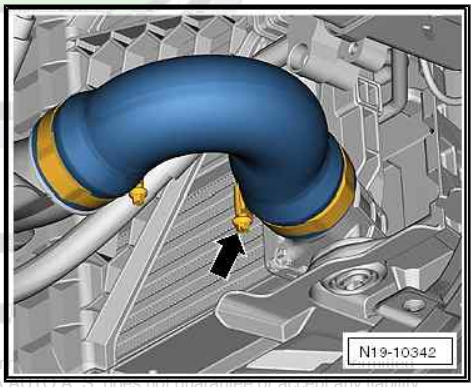
♦ Hose clamps up to a diameter of 25 mm - MP7-602 (3094)-

♦ Pliers for spring-type clips

Removing

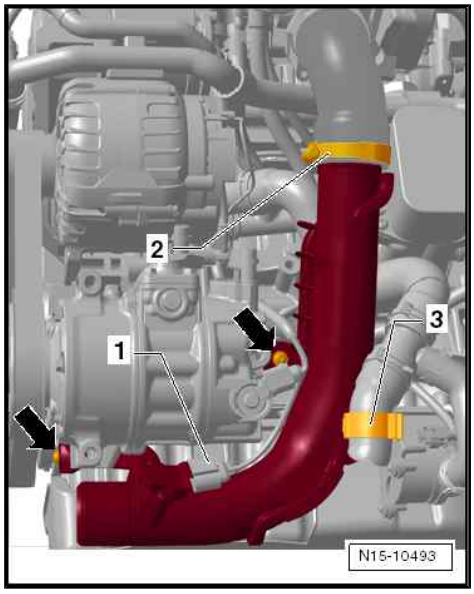
– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Remove right charge air hose.



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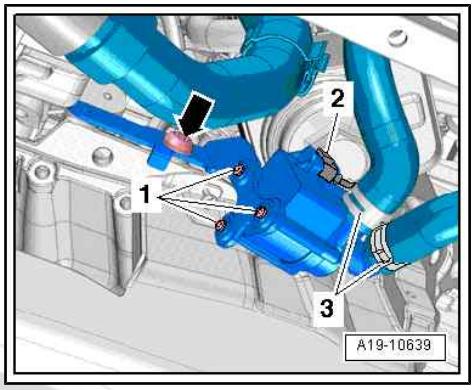
– Remove screws -arrows-.
– Detach coolant hose -3-.
– Slacken the hose clamp -2- and push the charge air pipe to the right.



Note

In order to collect flowing out coolant, place a cloth below the coolant recirculation pump 2 - V178- .

– Pinch off the coolant hoses with hose clamps up to a diameter of 25 mm - MP7-602- , slacken spring strap clamps -3- and detach the hoses.
– Disconnect plug connection -2-.
– Release screws -1- and remove coolant recirculation pump 2 - V178- .



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.*
- *Observe the instructions for installing the charge air hoses and tightening torques of the screw clamps ⇒ “2.3 Hose connections with screw clamps”, page 257 .*
- *After replacing, it is absolutely necessary to bleed the cooling system with the filling device - VAS 6096- . ⇒ “1.3 Draining and filling coolant”, page 160 . Otherwise, the air bubbles can cause consequential damage to the radiator for exhaust gas recirculation through overheating.*

– Check the level of coolant and top up if necessary ⇒ “1.3 Draining and filling coolant”, page 160 .

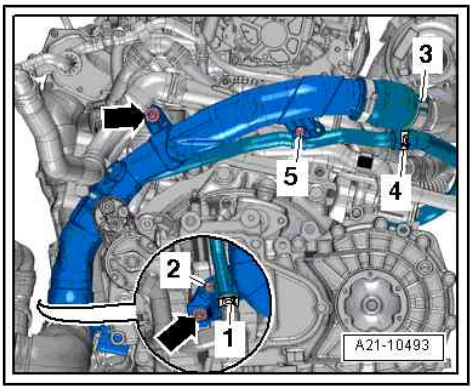
1.5 Replace coolant temperature sender - G62-

Condition

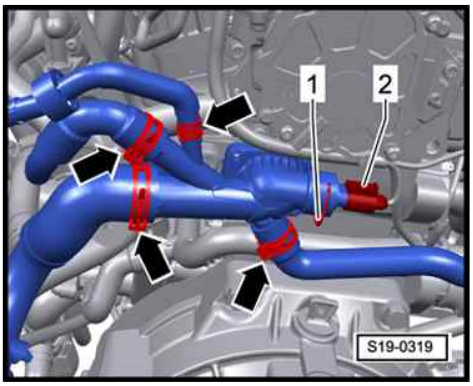
- Engine cold

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– Briefly open the cap for the coolant expansion reservoir in order to adjust the pressure in the cooling system.
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .
– Remove air filter
⇒ “3.6 Removing and installing air filter”, page 309 .
– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .
– Screw out screws -arrows- and screw -5-.
– Expose electrical cables and hoses on the left charge air pipe.
– Release hose clamp -3- and push charge air pipe to the side.



– Disconnect plug -2- at the coolant temperature sender - G62- .



Note

- *In order to collect flowing out coolant, place a cloth below the connection fitting.*
- *Have a new coolant temperature sender - G62- with a new gasket ring ready.*

– Remove the retaining clip -1-, pull the coolant temperature sender - G62- out of the connection fitting and install a new coolant temperature sender - G62- .

Further installation occurs in reverse order to removal.

– Check the level of coolant and top up if necessary
⇒ “1.3 Draining and filling coolant”, page 160 .

1.6 Replace coolant temperature sender at radiator outlet - G83-

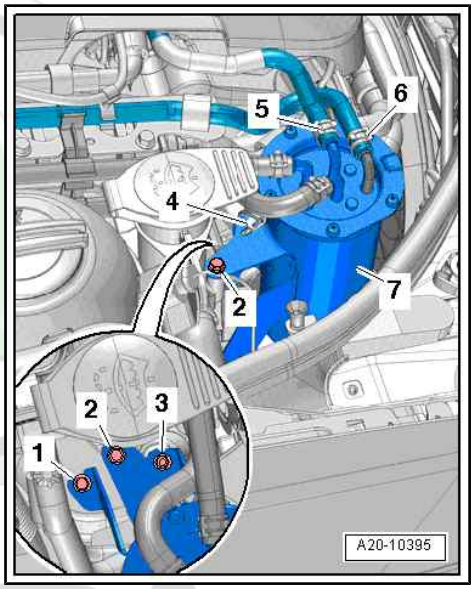
Condition

- Engine cold

– Briefly open the cap for the coolant expansion reservoir in order to adjust the pressure in the cooling system.
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

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– Release screw -1-.
– Release screw -2- and nut -3-.
– Remove bracket -4- with fuel filter -7- and lay to the side with the connected fuel hoses.

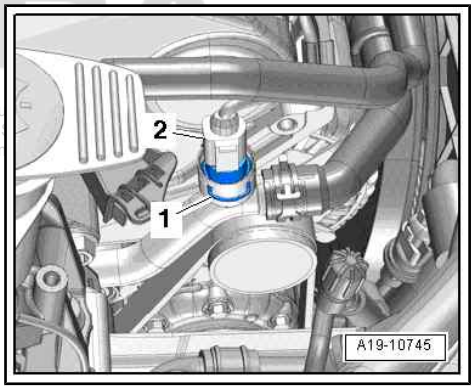


– Disconnect plug -2- at the coolant temperature sender at radiator outlet - G83- .

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Note

- *In order to collect flowing out coolant, place a cloth below the right coolant pipe.*
- *Have a new coolant temperature sender at radiator outlet - G83- with a new gasket ring ready.*



– Pull off the retaining clip -1-, remove the coolant temperature sender at radiator outlet - G83- from the connection of the right coolant pipe and install new coolant temperature sender - G83- .

Further installation occurs in reverse order.

– Install fuel filter
⇒ “2.3 Summary of components - fuel filter”, page 193 .
– Check the level of coolant and top up if necessary
⇒ “1.3 Draining and filling coolant”, page 160 .

2 Coolant pump and 4/2 way valve with coolant regulator

⇒ “2.1 Summary of components - coolant pump and 4/2 way valve with coolant regulator”, page 167

⇒ “2.2 Removing and installing coolant pump”, page 167

⇒ “2.3 Removing and installing 4/2 way valve with coolant regulator”, page 168

⇒ “2.4 Testing the coolant regulator”, page 171

2.1 Summary of components - coolant pump and 4/2 way valve with coolant regulator

1 - Coolant pump

- ❑ Removing and installing ⇒ “2.2 Removing and installing coolant pump”, page 167

2 - Screw

- ❑ 15 Nm

3 - O-ring

- ❑ Replace after disassembly

4 - O-ring

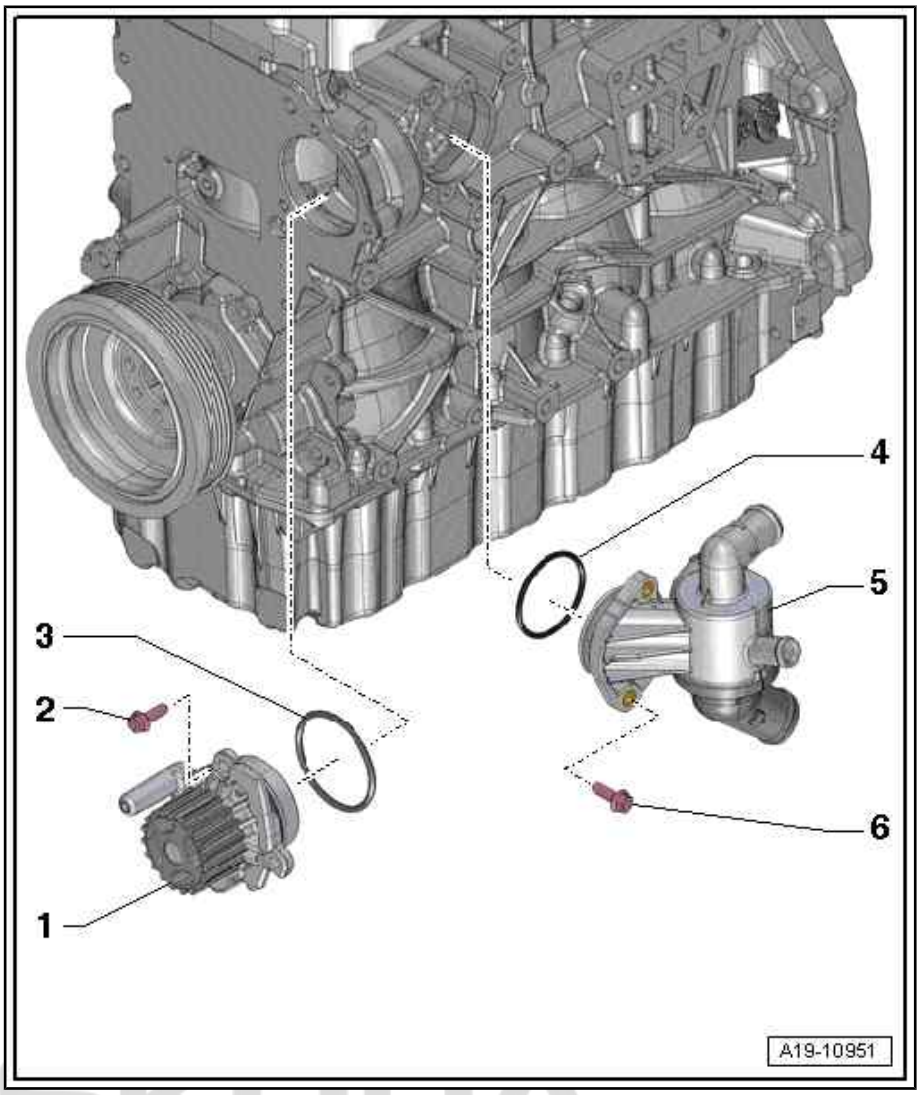
- ❑ Replace after disassembly

5 - 4/2 way valve with coolant regulator

- ❑ The coolant regulator is integrated in the 4/2 way valve and cannot be replaced separately
- ❑ Removing and installing ⇒ “2.3 Removing and installing 4/2 way valve with coolant regulator”, page 168
- ❑ Testing coolant thermostat ⇒ “2.4 Testing the coolant regulator”, page 171

6 - Screw

- ❑ 15 Nm



2.2 Removing and installing coolant pump

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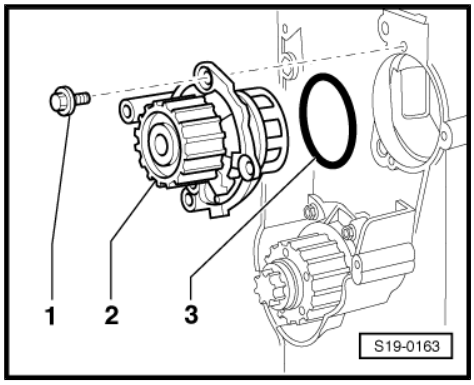
Removing

– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

– Remove toothed belt ⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Release screws -1- and remove coolant pump -2-.

– Remove O-ring -3-.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Renew O-ring.

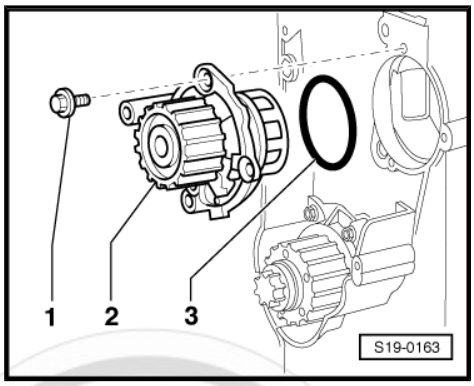
– Clean sealing surface for O-ring or smoothen.

– Moisten the new O-ring -3- with coolant.

– Attach the coolant pump -2-.

• Fitting position: Plug in housing points down.

– Insert screws -1- of coolant pump and tighten to ⇒ “2.1 Summary of components - coolant pump and 4/2 way valve with coolant regulator”, page 167 .



– Install the toothed belt ⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Top up coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

2.3 Removing and installing 4/2 way valve with coolant regulator

Special tools and workshop equipment required

♦ Removal tool for inner lining of the door panel - MP8-602/1-

♦ Pliers for spring-type clips

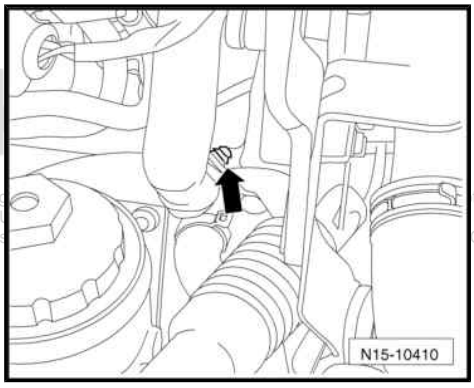
Removing

– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .

– Remove air filter with air mass meter - G70- and inlet hose ⇒ “3.6 Removing and installing air filter”, page 309 .

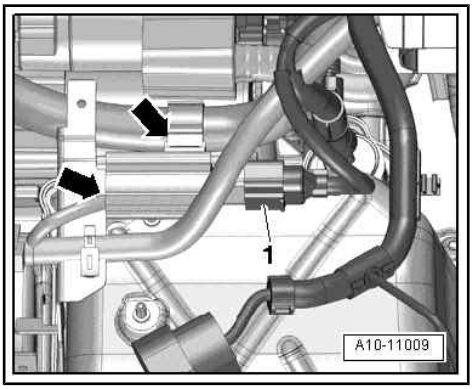
– Remove the battery with the battery tray ⇒ Electrical System; Rep. gr. 27 .

– Unclip the wiring loom from the holder -arrow-.

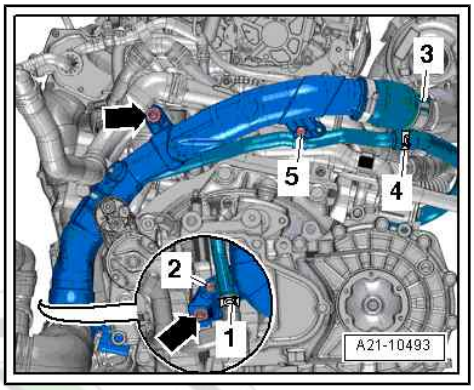


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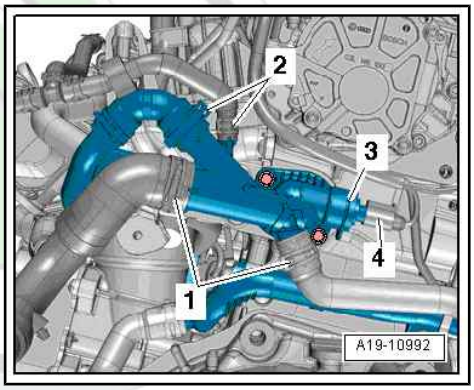
– Expose the wiring looms -arrows- and the electrical plug connection -1- on the bracket.



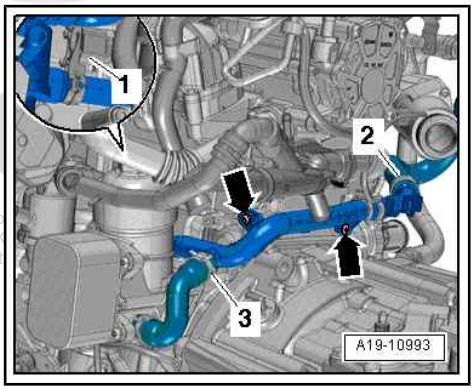
– Unscrew screws -2-, -5- and -arrows-.
– Expose electrical cables and hoses on the left charge air pipe.
– Release hose clamp -3- and remove left charge air pipe.



– Remove the coolant hoses, to do so slacken the hose clamps -1-.

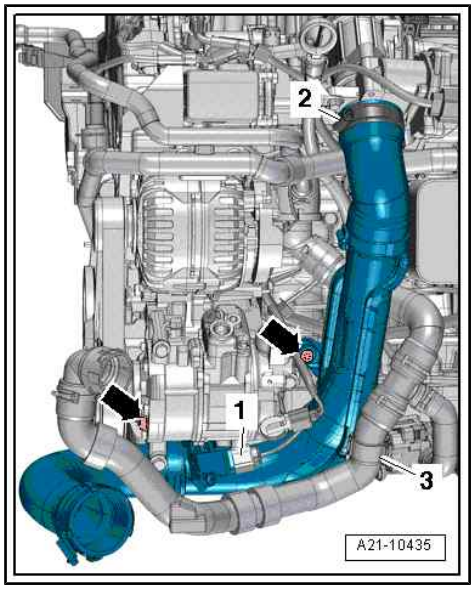


– Remove the plug connection -1- for the hall sender - G40- from the bracket and disconnect.
– Release the screws -arrows-, press off and detach the front coolant pipe from the 4/2 way valve to the left-hand side and leave it in the fitting position.

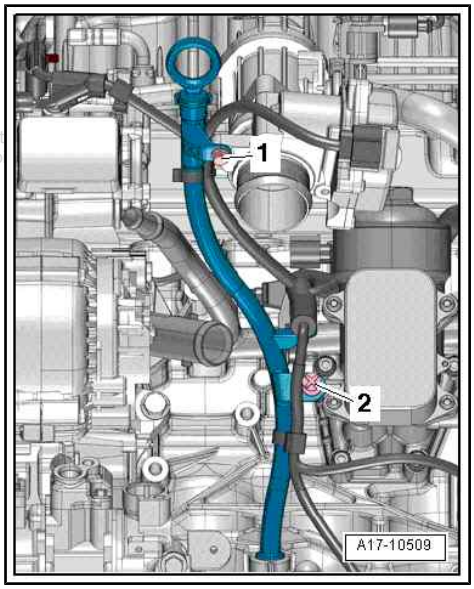


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– Remove screws -arrows-.
– Detach coolant hose -3-.
– Loosen hose clamp -2-.
– Disconnect the plug -1- at the charge pressure sender - G31- / intake air temperature sender - G42- and remove the right charge air pipe.
– Remove the generator ⇒ Electrical System; Rep. gr. 27 .



– Slightly pull out the oil dipstick and release the screw -1-.
– Press off clip -2- with removal tool for the door panel - MP8-602/1- .
– Pull out the oil dipstick guide pipe upwards out of the cylinder block and push it to the side.

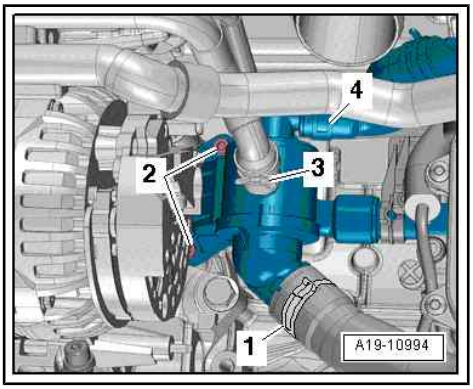


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– Unscrew screws -2-.

– Remove the coolant hoses, to do so slacken the hose clamps -1-, -3-, -4-.

– Remove 4/2 way valve with coolant regulator.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Renew O-ring.*
- *Hose connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.*
- *Observe the instructions for installing the charge air hoses and tightening torques of the screw clamps*
  ⇒ *"2.3 Hose connections with screw clamps", page 257* .
- *Secure all hose connections with specified clamps ⇒ ETKA - Electronic Catalogue of Original Parts .*

– Top up coolant
⇒ "1.3 Draining and filling coolant", page 160 .

2.4 Testing the coolant regulator

– Heat up the removed 4/2 way valve with coolant regulator in a water bath.

Start of opening	Full opening	Stroke
approx. 87 °C.	approximately 102 °C [1)]	min. 8 mm

[1)] Cannot be tested.

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3 Radiator and radiator fan

⇒ “3.1 Summary of components - radiator with one fan”, page 172

⇒ “3.2 Summary of components - radiator with two fans”, page 174

⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176

⇒ “3.4 Removing and installing radiator”, page 177

⇒ “3.5 Check cooling system for leaks”, page 179

3.1 Summary of components - radiator with one fan

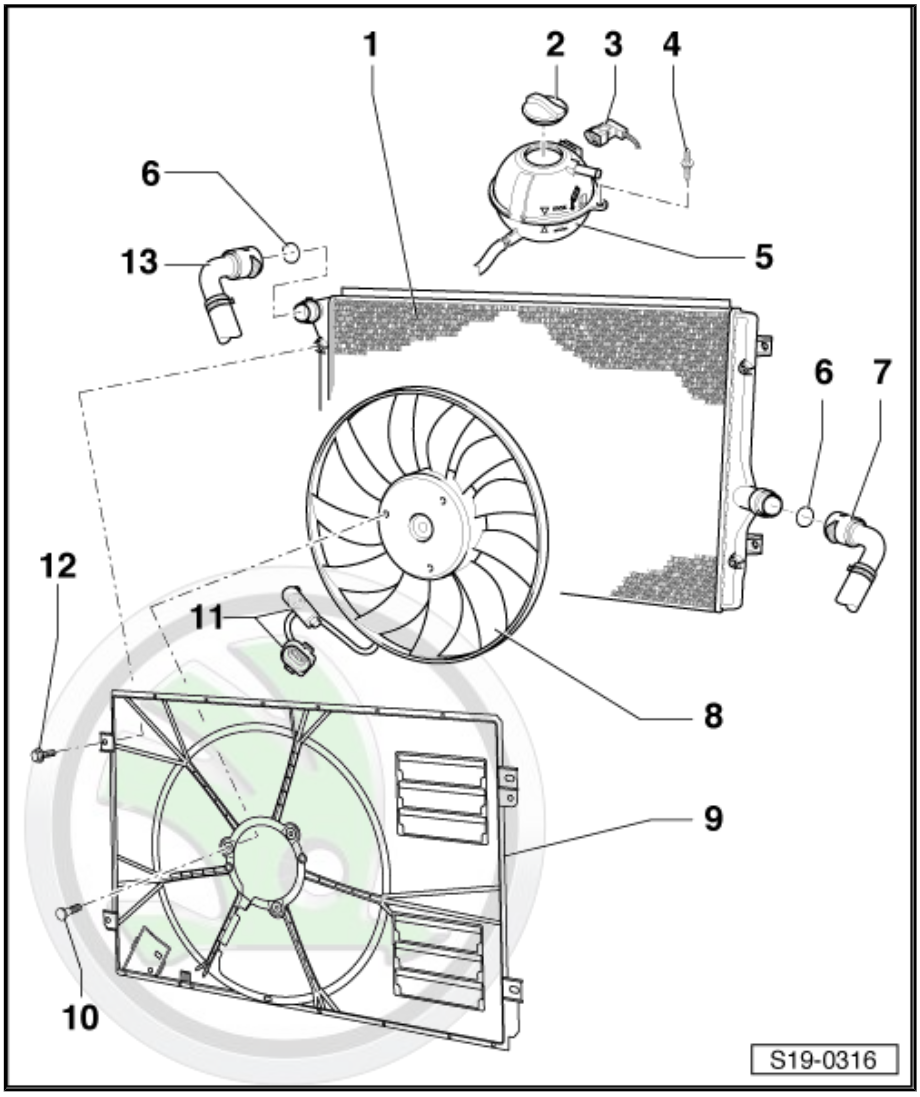
WARNING

When opening the expansion reservoir, out hot steam or hot coolant may escape. Cover the cap with a cloth and open carefully.

Note

- *When the engine is warm the cooling system is under pressure. If necessary, release pressure before beginning repair work.*
- *Secure all hose connections with spring strap clamps.*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*
- *Replace seals and sealing rings.*
- *The arrows affixed to the coolant pipes and the coolant hoses must stand opposite to each other.*

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1 - Radiator

- ❑ Removing and installing ⇒ “3.4 Removing and installing radiator”, page 177
- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

2 - Screw cap

- ❑ Test pressure 0.14...0.16 MPa (1.4...1.6 bar)
- ❑ Check ⇒ “3.5 Check cooling system for leaks”, page 179 .

3 - Connector

4 - Screw

- ❑ 3 Nm

5 - expansion reservoir

6 - O-ring

- ❑ replace if damaged

7 - Bottom coolant hose

- ❑ to connection fitting of 4/2 way valve with coolant regulator at cylinder block
- ❑ Connection diagram for coolant hoses ⇒ “1.2 Connection diagram for coolant hoses”, page 159

8 - Radiator fan - V7-

- ❑ Removing and installing ⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176

9 - Fan shroud

- ❑ Removing and installing ⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176

10 - Screw

- ❑ 5 Nm

11 - Connector

12 - Screw

- ❑ 5 Nm

13 - Top coolant hose

- ❑ To connection fitting at cylinder head
- ❑ Connection diagram for coolant hoses ⇒ “1.2 Connection diagram for coolant hoses”, page 159

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3.2 Summary of components - radiator with two fans

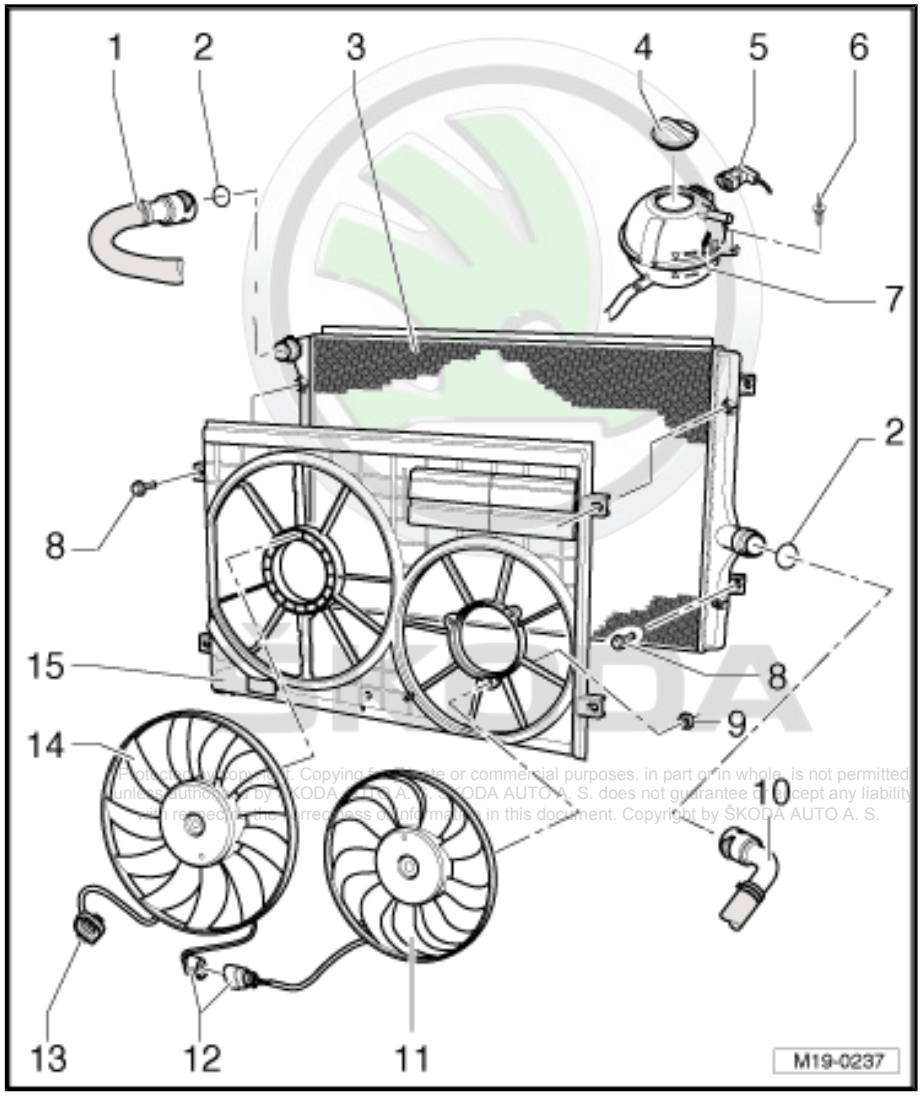
WARNING

When opening the expansion reservoir, out hot steam or hot coolant may escape. Cover the cap with a cloth and open carefully.

Note

- *When the engine is warm the cooling system is under pressure. If necessary, release pressure before beginning repair work.*
- *Secure all hose connections with spring strap clamps.*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*
- *Replace seals and sealing rings.*
- *The arrows affixed to the coolant pipes and the coolant hoses must stand opposite to each other.*

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1 - Top coolant hose

- ❑ To connection fitting at cylinder head
- ❑ Connection diagram for coolant hoses ⇒ “1.2 Connection diagram for coolant hoses”, page 159

2 - O-ring

- ❑ replace if damaged

3 - Radiator

- ❑ Removing and installing ⇒ “3.4 Removing and installing radiator”, page 177
- ❑ After replacing, fill with fresh coolant ⇒ “1.3 Draining and filling coolant”, page 160

4 - Screw cap

- ❑ Test pressure 0.14...0.16 MPa (1.4...1.6 bar)
- ❑ Check ⇒ “3.5 Check cooling system for leaks”, page 179 .

5 - Connector

6 - Screw

- ❑ 5 Nm

7 - expansion reservoir

- ❑ Check the cooling system for tightness ⇒ “3.5 Check cooling system for leaks”, page 179

8 - Screw

- ❑ 5 Nm

9 - Screw

- ❑ 5 Nm

10 - Bottom coolant hose

- ❑ to connection fitting of 4/2 way valve with coolant regulator at cylinder block
- ❑ Connection diagram for coolant hoses ⇒ “1.2 Connection diagram for coolant hoses”, page 159

11 - Radiator fan (right) - V35-

- ❑ Removing and installing ⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176

12 - Connector

13 - Connector

14 - Radiator fan - V7-

- ❑ Removing and installing ⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176

15 - Fan shroud

- ❑ Removing and installing ⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176

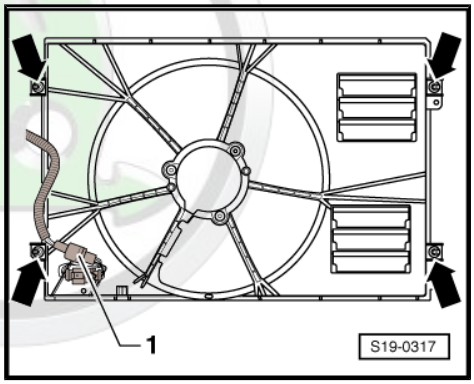
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3.3 Removing and installing fan shroud and radiator fan

Removing

For vehicles with a fan

– Unscrew top screws -arrows- at the top of the fan shroud.



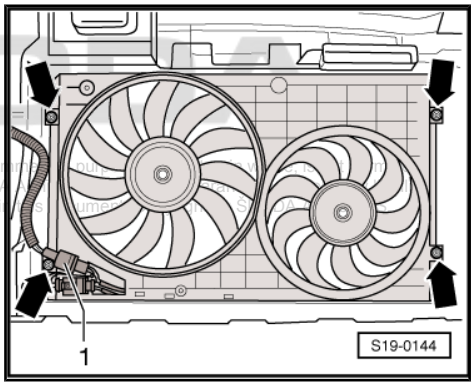
For vehicles with two fans

– Unscrew top screws -arrows- at the top of the fan shroud.

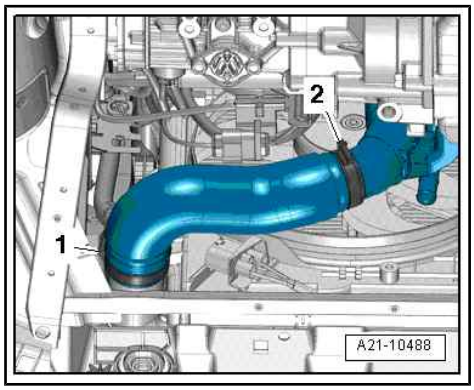
Continued for all vehicles

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

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– Remove the left charge air hose, to do so slacken the screwed hose clamps -1- and -2-.



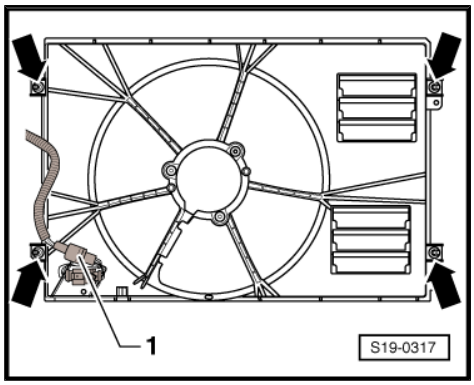
For vehicles with a fan

– Disconnect plug connection -1-.

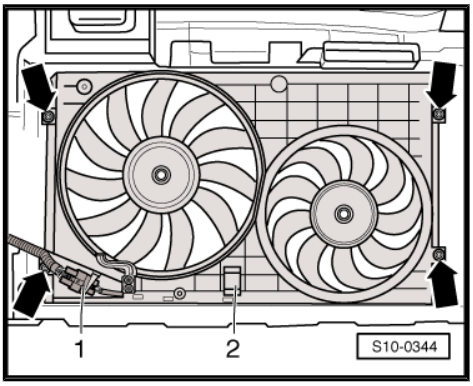
– Unscrew bottom screws -arrows- at the bottom of the fan shroud.

– Remove fan shroud with radiator fan downwards.

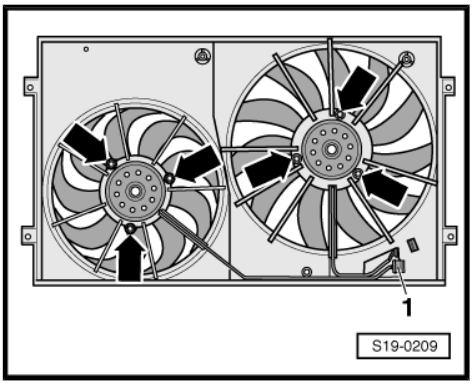
– Release the screws of the fan and remove the radiator fan from the shroud.



For vehicles with two fans



– Disconnect plug connection -1-.
– Unscrew bottom screws -arrows- at the bottom of the fan shroud.
– Remove fan shroud with radiator fans downwards.



– Disconnect the plug connection -1- and expose cables.
– Unscrew the nuts -arrows- and remove the radiator fan from the fan shroud.

Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Tightening torques - summaries of components

- Screws for fan shroud with one fan
  ⇒ “3.1 Summary of components - radiator with one fan”, page 172
- Screws for fan shroud with two fans
  ⇒ “3.2 Summary of components - radiator with two fans”, page 174

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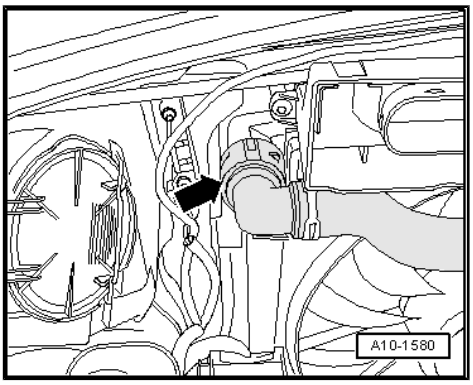
3.4 Removing and installing radiator

Special tools and workshop equipment required

- Catch pan , e.g. -VAS 6208-
- Pliers for spring-type clips

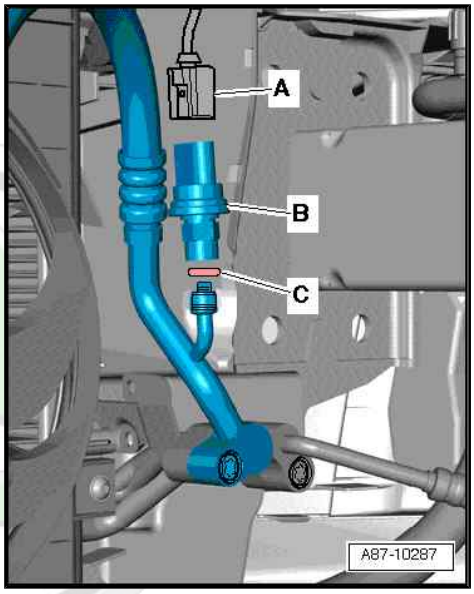
Removing

– Drain coolant ⇒ “1.3 Draining and filling coolant”, page 160 .
– Pull off left coolant hose from radiator -arrow-.
– Remove fan shroud with radiator fans ⇒ “3.3 Removing and installing fan shroud and radiator fan ”, page 176 .



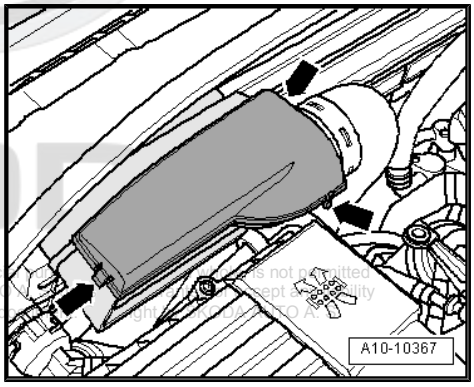
For vehicles with air conditioning

– Disconnect plug -A- on the high pressure sender - G65- -B-.



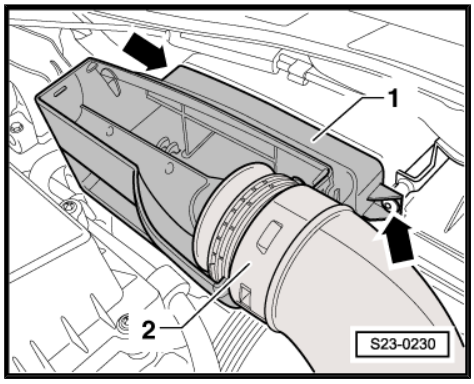
Continued for all vehicles

– Remove cover for connection fitting, to do so release lateral retaining clasps -arrows-.

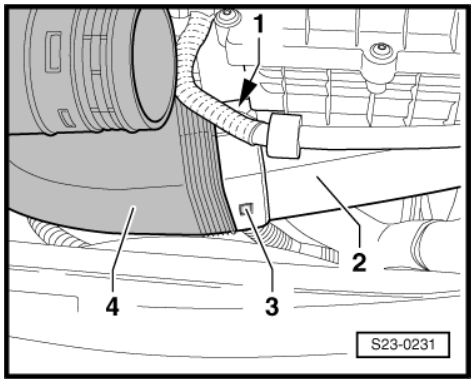


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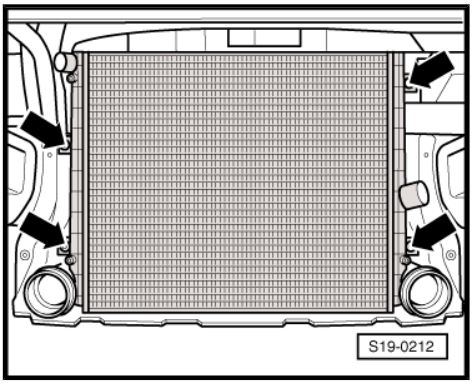
– Release screws -arrows- for the inlet connection -1- and remove connecting hose -2-.



– Press in catches -1- and -3- and pull off connecting hose -4- from air filter -2-.



– Screw out screws -arrows- and remove the radiator upwards.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Replace gasket rings and O-rings.*
- *Secure all hose connections with spring strap clamps.*

– Top up coolant
⇒ “1.3 Draining and filling coolant”, page 160 .

3.5 Check cooling system for leaks

⇒ “3.5.1 Checking with the cooling system testing device V.A.G 1274 ”, page 179

⇒ “3.5.2 Checking with the cooling system testing device V.A.G 1274 B ”, page 180

3.5.1 Checking with the cooling system testing device - V.A.G 1274-

Special tools and workshop equipment required

- Cooling system testing device , e.g. -V.A.G 1274-
- Adapter , e.g. -V.A.G 1274/8-
- Adapter , e.g. -V.A.G 1274/9-

Test condition

- Engine must be warm.

WARNING

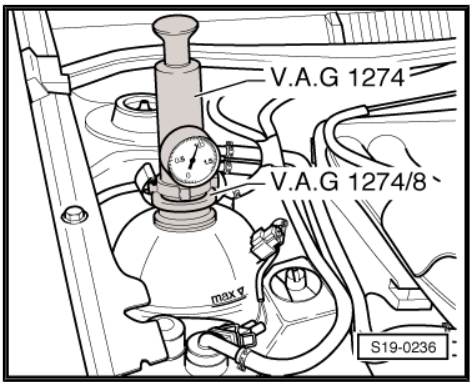
When opening the expansion reservoir, out hot steam or hot coolant may escape.

- ***Wear safety goggles and safety clothing to avoid eye injuries and scalding.***
- ***Cover the cap with a cloth and open carefully.***

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– Open the cap of the coolant expansion reservoir.

– Position tester - V.A.G 1274- with adapter - V.A.G 1274/8- on the expansion reservoir.



– Generate a pressure of approx. 0.1 MPar (1.0 bar) for testing the cooling system.

If pressure drops:

– Search position of the leak and repair fault.

If no leaks are found:

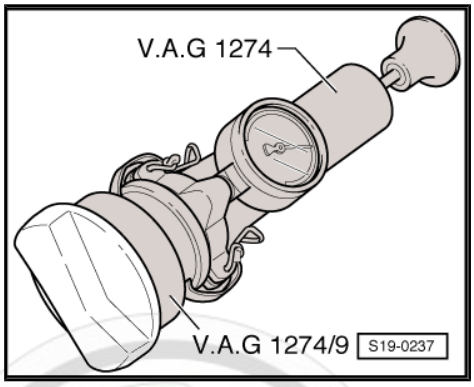
– Test air-tightness of the exhaust gas recirculation valve
⇒ “2.2 Test air-tightness of the radiator for exhaust gas recirculation”, page 344 .

Test the pressure valve in the cap

– Fit the cooling system testing device - V.A.G 1274- with adapter - V.A.G 1274/9- on the cap.
– Generate a pressure for testing the pressure valve in the screw cap.
• The pressure valve should open at a pressure of 0.14...0.16 MPa (1.4...1.6 bar).

If the valve does not open in the prescribed pressure range:

– Renew cap.



3.5.2 Checking with the cooling system testing device - V.A.G 1274 B-

Special tools and workshop equipment required

♦ Cooling system testing device , e.g. -V.A.G 1274 B-
♦ Adapter , e.g. -V.A.G 1274/8-
♦ Adapter , e.g. -V.A.G 1274/9-

Test condition

• Engine must be warm.

WARNING

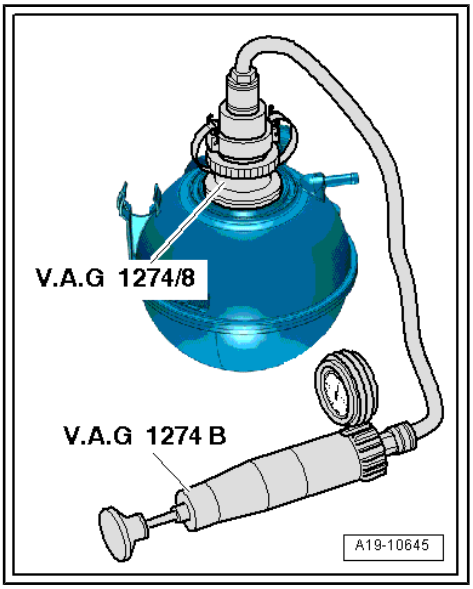
When opening the expansion reservoir, out hot steam or hot coolant may escape.

♦ *Wear safety goggles and safety clothing to avoid eye injuries and scalding.*
♦ *Cover the cap with a cloth and open carefully.*

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– Open the cap of the coolant expansion reservoir.
– Screw the adapter - V.A.G 1274/8- into the coolant expansion reservoir.
– Connect the connecting piece - V.A.G 1274 B/1- to the adapter - V.A.G 1274/8- .

– Connect the connecting piece - V.A.G 1274 B/1- to the cooling system testing device - V.A.G 1274 B- via the supplied connecting hose.
– Using the hand pump of the testing device generate a pressure of approx. 0.1 MPa (1.0 bar).



WARNING

Risk of scalding!

- *Before the cooling system testing device - V.A.G 1274 B- is separated from the connecting hose or the connecting piece - V.A.G 1274 B/1- , the existing pressure must absolutely be released.*
- *For this step, press the pressure relief valve on the cooling system testing device - V.A.G 1274 B- and hold it pressed until the pressure gauge indicates the value »0«.*

If pressure drops:

– Search position of the leak and repair fault.

If no leaks are found:

– Test air-tightness of the exhaust gas recirculation valve ⇒ “2.2 Test air-tightness of the radiator for exhaust gas recirculation”, page 344 .

Test the pressure valve in the cap

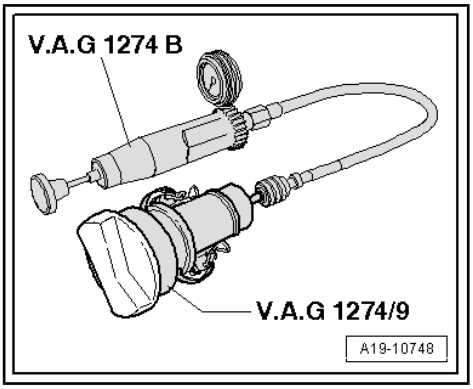
– Screw the screw cap into the adapter - V.A.G 1274/9- .
– Connect the connecting piece - V.A.G 1274 B/1- to the adapter - V.A.G 1274/9- .

– Connect the connecting piece - V.A.G 1274 B/1- to the cooling system testing device - V.A.G 1274 B- via the supplied connecting hose.
– Generate a pressure for testing the pressure valve in the screw cap.

- The pressure valve should open at a pressure of 0.14...0.16 MPa (1.4...1.6 bar).

If the valve does not open in the prescribed pressure range:

– Renew cap.



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20 – Fuel supply system

1 Procedure in case of misfuelling

⇒ “1.1 Step 1: engine started with incorrect fuel”, page 183

⇒ “1.2 Step 2: the engine was not started with incorrect fuel”, page 184

⇒ “1.3 Step 3: metal swarfs are present in the fuel delivery unit and the fuel tank”, page 185

⇒ “1.4 Step 4: no metal swarfs are present in the fuel delivery unit and the fuel tank”, page 186

⇒ “1.5 Step 5: metal swarfs are present in the high pressure pump”, page 187

⇒ “1.6 Step 6: no metal swarfs are present in the high pressure pump”, page 187

Note

- *Fuel lines are secured with quick-release couplings. Separate push-fit couplings for fuel lines ⇒ “2.10 Separating push-on couplings”, page 208 .*
- *Fuel hoses must only be secured with spring-type clips ⇒ ET-KA - Electronic Catalogue of Original Parts .*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*

Observe the safety instructions
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

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Observe rules for cleanliness
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

Observe the instructions for the fuel hose in the engine compartment
⇒ “3.6 Removing and replacing the fuel hoses in the engine compartment”, page 9 .

Caution

In case of misfuelling irreversible damage can occur to the high pressure components, in particular the high pressure pump, because of insufficient lubrication due to the diesel fuel or mechanical contaminations in the fuel or water.

- ***Damage can be expected in the form of scoring and particle erosion.***
- ***Thus, free metal particles contaminate the fuel system as well as the injection system, whereby further damage can be expected especially to the fuel pressure regulating valve and in the injection units.***
- ***If there is uncertainty about the fuel quality, take a sample. Analyse the fuel using the fuel analyser - VAS 6774- ⇒ Owner's Manual . This analyser does not replace laboratory analysis in the event of warranty claims!***

Note

Follow the individual work sequences in this guideline like a flow chart, taking account of the various factors.

If the engine was started with incorrect fuel?

Yes ⇒ Step 1: engine was started with incorrect fuel
⇒ “1.1 Step 1: engine started with incorrect fuel”, page 183 .

No ⇒ Step 2: the engine was not started with incorrect fuel
⇒ “1.2 Step 2: the engine was not started with incorrect fuel”, page 184 .

1.1 Step 1: engine started with incorrect fuel

– Completely empty the fuel tank
⇒ “2.4 Extract fuel from the fuel tank”, page 196 .

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

Yeti vehicles

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

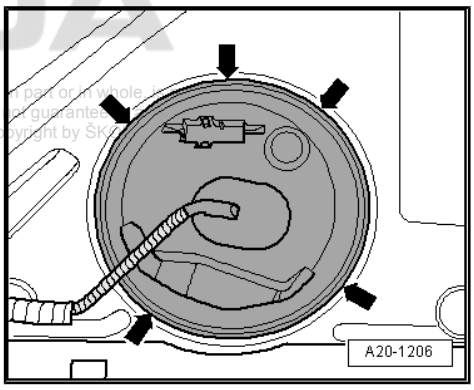
Continued for all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.

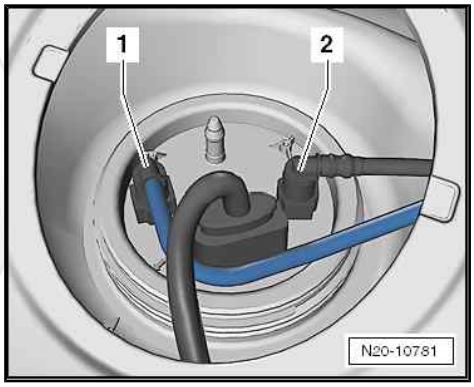
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WARNING

Ensure that when the battery is connected the fuel pump cannot be activated by the opening door! Fuel can spill out when the system is open.



– Disconnect fuel return line -1- at the closing flange. Unlock the quick coupling and disconnect
⇒ “2.10 Separating push-on couplings”, page 208 .
– Connect connecting line - VAS 6551/5-2- of the pressure gauge to the fuel return line -1-.
– Guide the free end of the line connecting line - VAS 6551/5-2- into a suitable container.
– Connect vehicle diagnostic tester .
– Perform Targeted Functions `empty fuel tank`.



Note

The fuel pump is now activated.

– If necessary, repeat this procedure until the fuel tank is completely empty.

Remove fuel delivery unit:

♦ Superb II, Yeti and vehicles with four-wheel drive Octavia II
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

– Carry out a visual inspection to assure that the empty fuel tank as well as the emptied fuel delivery unit do not contain any metal abrasion or swarf.

In the event that metal swarfs are present?

Yes ⇒ Step 3: metal swarfs are present in the fuel delivery unit and the fuel tank
⇒ “1.3 Step 3: metal swarfs are present in the fuel delivery unit and the fuel tank”, page 185 .

No ⇒ Step 4: no metal swarfs are present in the fuel delivery unit and the fuel tank
⇒ “1.4 Step 4: no metal swarfs are present in the fuel delivery unit and the fuel tank”, page 186 .

1.2 Step 2: the engine was not started with incorrect fuel

– Completely empty the fuel tank
⇒ “2.4 Extract fuel from the fuel tank”, page 196 .

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

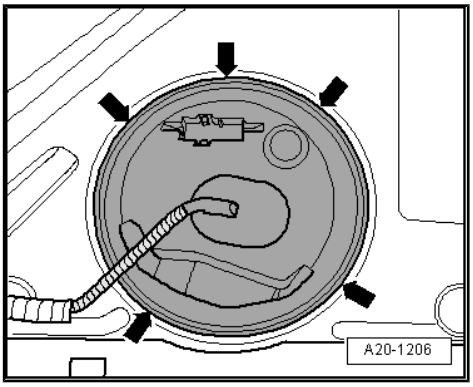
Yeti vehicles

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .
– Remove floor covering under the rear seats.

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Continued for all vehicles

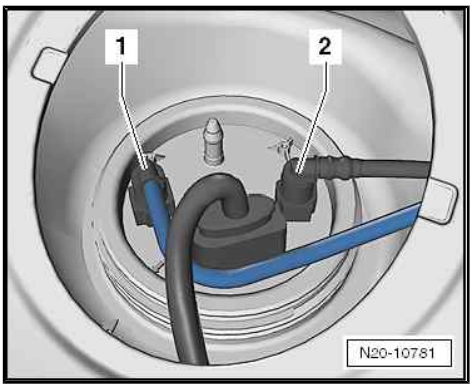
– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



WARNING

Ensure that when the battery is connected the fuel pump cannot be activated by the opening door! Fuel can spill out when the system is open.

– Disconnect fuel return line -1- at the closing flange. Unlock the quick coupling and disconnect
⇒ “2.10 Separating push-on couplings”, page 208 .



– Connect connecting line - VAS 6551/5-2- of the pressure gauge to the fuel return line -1-.

– Guide the free end of the line connecting line - VAS 6551/5-2- into a suitable container.

– Connect vehicle diagnostic tester .

– Perform Targeted Functions `empty fuel tank`.

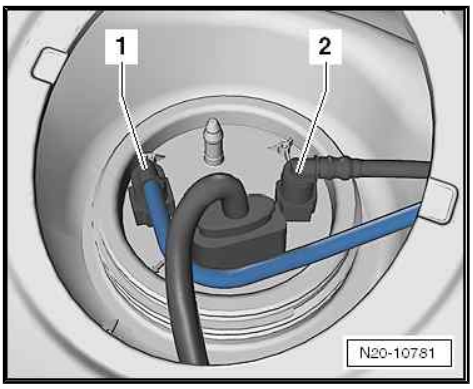
Note

The fuel pump is now activated.

– If necessary, repeat this procedure until the fuel tank is completely empty.

– Fill the fuel tank with 5 litres of diesel fuel and empty it again in the way shown above.

– Reconnect the fuel return-flow line -1-.



– Replace the fuel filter
⇒ “2.3 Summary of components - fuel filter”, page 193 .

– Fill vehicle tank and take it for a test run.

1.3 Step 3: metal swarfs are present in the fuel delivery unit and the fuel tank

– Clean, for example using fuel delivery unit and fuel tank with diesel suction device , e. g. -VAS 5226- .

– Install fuel delivery unit:

♦ Superb II, Yeti and vehicles with four-wheel drive Octavia II
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

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♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

Vehicles fitted with auxiliary heating

– Check the fuel line between the fuel tank and dosing pump - V54- for swarfs. Replace where necessary ⇒ Heating, Air Conditioning; Rep. gr. 82 .

Continued for all vehicles

– Fill the fuel tank with 5 litres of diesel fuel and empty it again in the way shown above.

– Replace the following high pressure components:

♦ High pressure pump
⇒ “2.3 Removing and installing the high pressure pump”, page 273 .

♦ High pressure lines
⇒ “2.11 Installing the high pressure lines”, page 289 .

♦ Fuel distributor including fuel pressure control valve - N276- and fuel pressure transmitter - G247-
⇒ “2.12 Removing and installing the fuel distributor”, page 291 .

♦ Injection units
⇒ “2.10 Removing and installing the injection units”, page 284 .

♦ Fuel return-flow lines
⇒ “2.2 Summary of components - injection units”, page 270 , -Pos. 6-.

♦ Replace the fuel filter
⇒ “2.3 Summary of components - fuel filter”, page 193 .

– Completely fill up the fuel tank with diesel fuel.

– Venting air from the fuel system
⇒ “1.3 Filling/bleeding the fuel system”, page 266 .

– Perform a test drive

1.4 Step 4: no metal swarfs are present in the fuel delivery unit and the fuel tank

– Fill the fuel tank with 5 litres of diesel fuel and empty it again in the way shown above.

WARNING

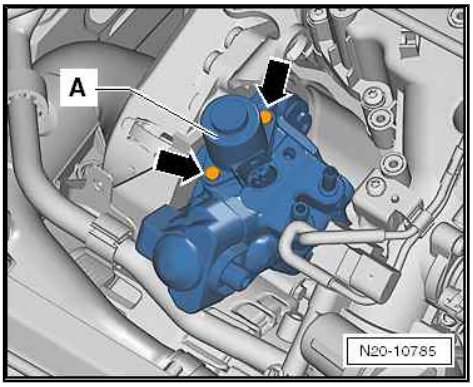
When removing the fuel dosage valve - N290- from the high pressure pump, there is the risk that dirt may get into the pump whereby damage to the pump could occur. Therefore, clean the fuel dosage valve as well as the high pressure pump as thoroughly as possible before removing, while doing so observe the rules of cleanliness when working on the injection system
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Disconnect the plug from the valve.

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– Unscrew screws -arrows- and remove the fuel dosage valve -A- from the high pressure pump.

– Carry out a visual inspection to assure that the fuel dosage valve - N290- as well as the high pressure pump do not contain any metal abrasion or swarf.



In the event that metal swarfs are present?

Yes ⇒ Step 5: metal swarfs are present in the high pressure pump
⇒ “1.5 Step 5: metal swarfs are present in the high pressure pump”, page 187 .

No ⇒ Step 6: no metal swarfs are present in the high pressure pump
⇒ “1.6 Step 6: no metal swarfs are present in the high pressure pump”, page 187 .

1.5 Step 5: metal swarfs are present in the high pressure pump

– Replace the following high pressure components:

- High pressure pump
⇒ “2.3 Removing and installing the high pressure pump”, page 273 .
- High pressure lines
⇒ “2.11 Installing the high pressure lines”, page 289 .
- Fuel distributor including fuel pressure control valve - N276- and fuel pressure transmitter - G247-
⇒ “2.12 Removing and installing the fuel distributor”, page 291 .
- Injection units
⇒ “2.10 Removing and installing the injection units”, page 284 .
- Fuel return-flow lines
⇒ “2.2 Summary of components - injection units”, page 270 , -Pos. 6-.

– Completely fill up the fuel tank with diesel fuel.

– Venting air from the fuel system
⇒ “1.3 Filling/bleeding the fuel system”, page 266 .

– Perform a test drive

1.6 Step 6: no metal swarfs are present in the high pressure pump

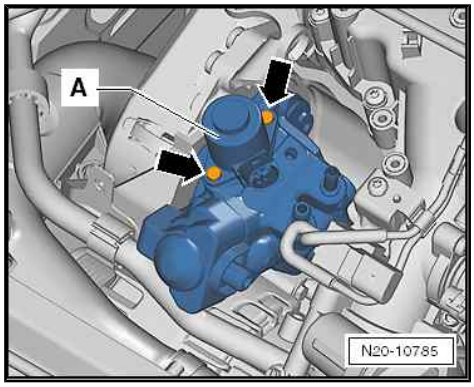
WARNING

Watch out for damage to sealing rings for fuel dosage valve - N290- . If a sealing ring is damaged, the high pressure pump must be replaced.

– Slightly moisten the lower O-ring with fuel and carefully slide the fuel dosage valve into the high pressure pump housing with a rotary movement.

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– Screw in screws -arrows- only by hand.
– Pre-tighten screws to 3 Nm, then fully tighten to 7 Nm.
– Replace the fuel filter
⇒ “2.3 Summary of components - fuel filter”, page 193 .
– Venting air from the fuel system
⇒ “1.3 Filling/bleeding the fuel system”, page 266 .
– Fill vehicle tank and take it for a test run.



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2 Removing and installing parts of the fuel supply system

⇒ “2.1 Summary of components - fuel tank with attached parts (Octavia II with front-wheel drive)”, page 189

⇒ “2.2 Summary of components - fuel tank with attached parts (Superb II, Yeti, Octavia II with four-wheel drive)”, page 191

⇒ “2.3 Summary of components - fuel filter”, page 193

⇒ “2.4 Extract fuel from the fuel tank”, page 196

⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198

⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200

⇒ “2.7 Removing and installing the fuel gauge sender G ”, page 204

⇒ “2.8 Removing and installing fuel gauge sender 2 G169 ”, page 206

⇒ “2.9 Removing and installing suction jet pump”, page 208

⇒ “2.10 Separating push-on couplings”, page 208

⇒ “2.11 Removing and installing fuel tank (Octavia II with front-wheel drive)”, page 211

⇒ “2.12 Removing and installing fuel tank (Superb II, Yeti, Octavia II with four-wheel drive)”, page 213

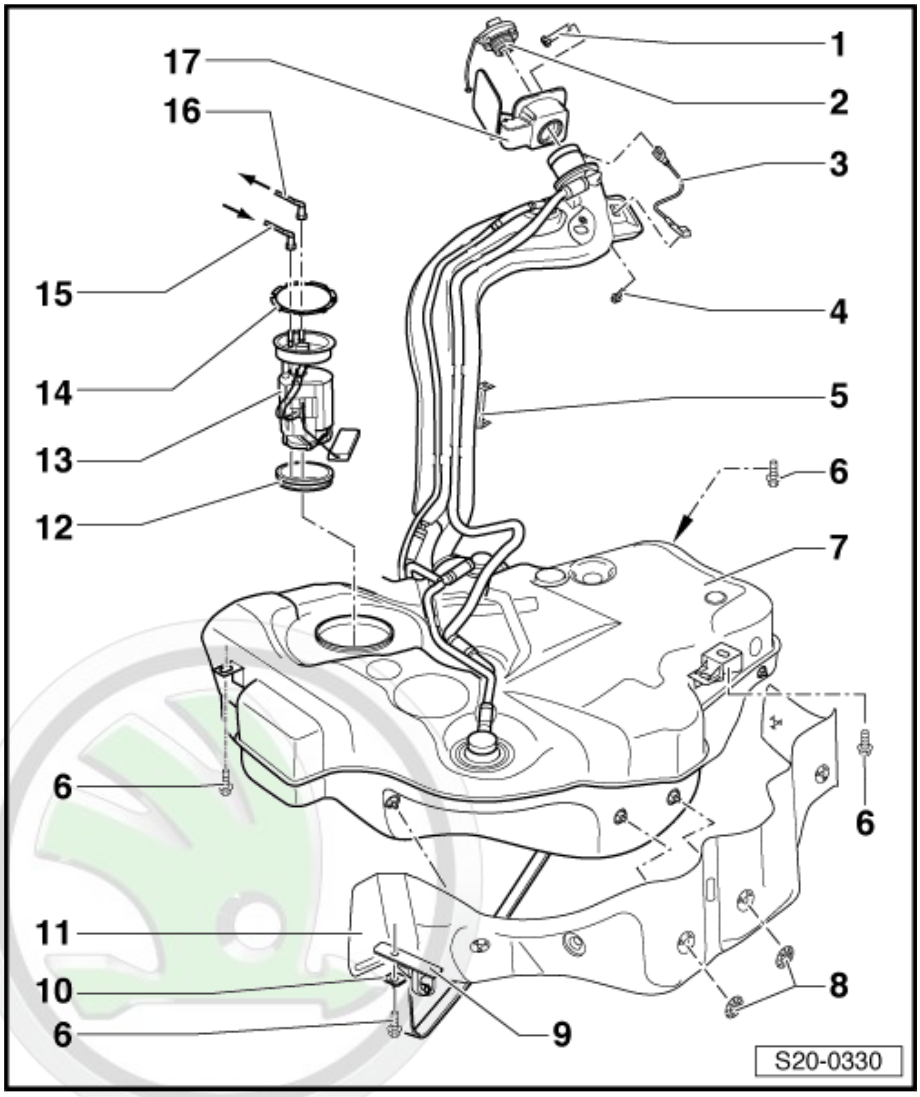
⇒ “2.13 Removing and installing additional fuel pump V393 or fuel pump 2 V277 ”, page 217

2.1 Summary of components - fuel tank with attached parts (Octavia II with front-wheel drive)

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Note

- *Fuel lines are secured with quick-release couplings. Separate push-fit couplings for fuel lines ⇒ “2.10 Separating push-on couplings”, page 208 .*
- *Fuel hoses at the engine must only be secured with spring-type clamps ⇒ ETKA - Electronic catalogue of original parts .*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*



1 - Mounting part

2 - Screw cap

- ❑ replace the O-ring if it is damaged

3 - Earth connection

- ❑ check for firm seating

4 - Screw

- ❑ 11 Nm

5 - Guide

6 - Screw

- ❑ Replace after disassembly
- ❑ 25 Nm

7 - Fuel tank

- ❑ when removing, support using the engine/gearbox jack , e.g. -V.A.G 1383 A-
- ❑ Removing and installing ⇒ “2.11 Removing and installing fuel tank (Octavia II with front-wheel drive)”, page 211

8 - Circlip

9 - Mounting bracket

- ❑ for exhaust pipe

10 - Tensioning strap

- ❑ Check fitting position

11 - Heat shield

12 - Sealing ring

- ❑ Replace after disassembly
- ❑ insert dry into the opening of the fuel tank
- ❑ must be moistened on the inside with fuel before assembly of the fuel delivery unit

13 - Fuel pump

- ❑ with sender for fuel gauge display
- ❑ Removing and installing ⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198
- ❑ Note correct installation position on the fuel tank ⇒ page 191
- ❑ inspecting fuel pump ⇒ “3 inspecting fuel pump”, page 219
- ❑ Clean strainer if dirty
- ❑ removing and installing the sender for fuel gauge ⇒ “2.7 Removing and installing the fuel gauge sender G ”, page 204

14 - Lock ring

- ❑ slacken and tighten with wrench - T30101 (3087)-
- ❑ check correct fitting
- ❑ 110 Nm

15 - Return-flow line

- ❑ from fuel filter
- ❑ clipped in place on fuel tank
- ❑ check correct fitting

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- ❑ blue

16 - Feed line

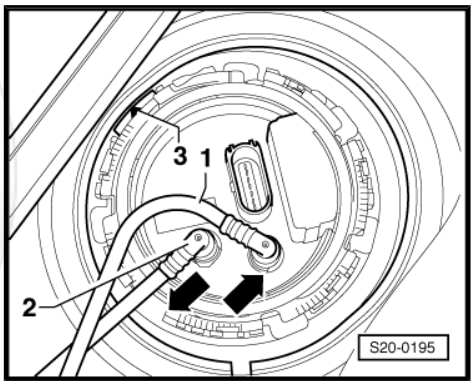
- ❑ to fuel filter
- ❑ clipped in place on fuel tank
- ❑ check correct fitting
- ❑ black

17 - Fuel tank lid unit

- ❑ with rubber bowl
- ❑ Removing and installing ⇒ Body Work; Rep. gr. 55

Fitting location of the fuel delivery unit

The marking -3- on the flange of the fuel delivery unit points against the direction of travel.



Note

The fuel delivery unit can only be installed in this position.

Return line -1- blue.

Feed line -2- black.

Note

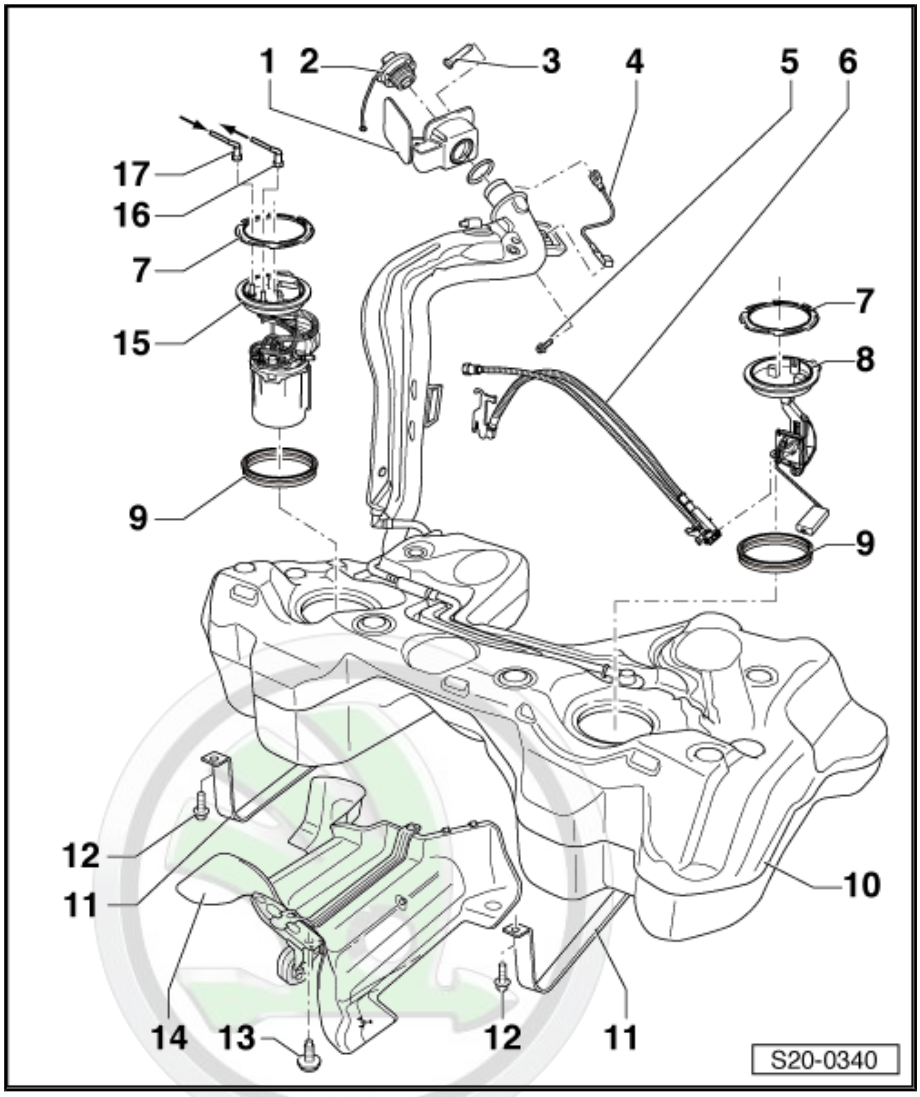
After installing the fuel delivery unit, check whether the feed line and the return-flow line are correctly clipped in place on the fuel tank.

2.2 Summary of components - fuel tank with attached parts (Superb II, Yeti, Octavia II with four-wheel drive)

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Note

- *Fuel lines are secured with quick-release couplings. Separate push-fit couplings for fuel lines* *⇒ "2.10 Separating push-on couplings", page 208* .
- *Fuel hoses at the engine must only be secured with spring-type clamps ⇒ ETKA - Electronic catalogue of original parts .*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*



1 - Fuel tank lid unit

- ❑ with rubber bowl
- ❑ Removing and installing ⇒ Body Work; Rep. gr. 55

2 - Screw cap

- ❑ replace the O-ring if it is damaged

3 - Mounting part

4 - Earth connection

- ❑ check for firm seating

5 - Screw

- ❑ 10 Nm

6 - Suction spray pump

- ❑ connected to the fuel gauge sender 2 - G169-
- ❑ Removing and installing ⇒ “2.9 Removing and installing suction jet pump”, page 208

7 - Lock ring

- ❑ use wrench - T30101 (3087)- for removing and installing
- ❑ check for firm seating
- ❑ 110 Nm

8 - Fuel gauge sender 2 - G169-

- ❑ Note installation position on the fuel tank ⇒ page 193
- ❑ Removing and installing ⇒ “2.8 Removing and installing fuel gauge sender 2 G169 ”, page 206

9 - Sealing ring

- ❑ Replace after disassembly
- ❑ insert dry into the opening of the fuel tank
- ❑ only moisten with fuel from the inside for installing the flange

10 - Fuel tank

- ❑ when removing support with the engine/gearbox jack, e.g. -V.A.G 1383 A-
- ❑ Removing and installing ⇒ “2.12 Removing and installing fuel tank (Superb II, Yeti, Octavia II with four-wheel drive)”, page 213

11 - Tensioning strap

- ❑ Check fitting position

12 - Screw

- ❑ Replace after disassembly
- ❑ 25 Nm

13 - Screw

- ❑ 25 Nm

14 - Heat shield

15 - Fuel pump

- ❑ with fuel gauge sender - G-

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- ❑ Removing and installing
  ⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200
- ❑ Note installation position on the fuel tank ⇒ page 193
- ❑ inspecting fuel pump ⇒ “3 inspecting fuel pump”, page 219
- ❑ Clean strainer if dirty
- ❑ Removing and installing the fuel gauge sender - G-
  ⇒ “2.7 Removing and installing the fuel gauge sender G ”, page 204

16 - Feed line

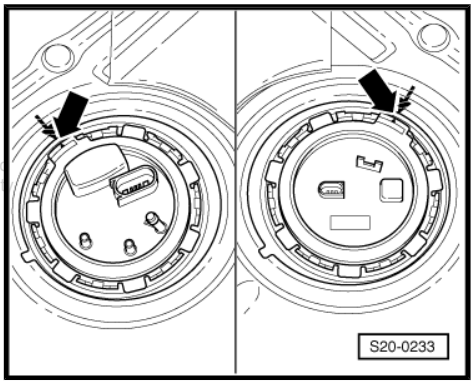
- ❑ to fuel filter
- ❑ clipped in place on fuel tank
- ❑ check for firm seating
- ❑ black

17 - Return-flow line

- ❑ from fuel filter
- ❑ clipped in place on fuel tank
- ❑ check for firm seating
- ❑ blue

Fitting position of the fuel delivery unit (with the transmitter for fuel gauge display - G-) and the flange with the fuel gauge transmitter 2 - G169-

The markings on the flanges must be aligned with markings on the fuel tank -arrows-.



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Note

- ♦ *The markings on the fuel tank are hardly visible.*
- ♦ *After installing the fuel delivery unit, check whether the feed line and the return-flow line are correctly clipped in place on the fuel tank.*

2.3 Summary of components - fuel filter

⇒ “2.3.1 Fuel filter for engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA”, page 193

⇒ “2.3.2 Fuel filter for engines with identification characters CLCA, CLCB, CLJA”, page 195

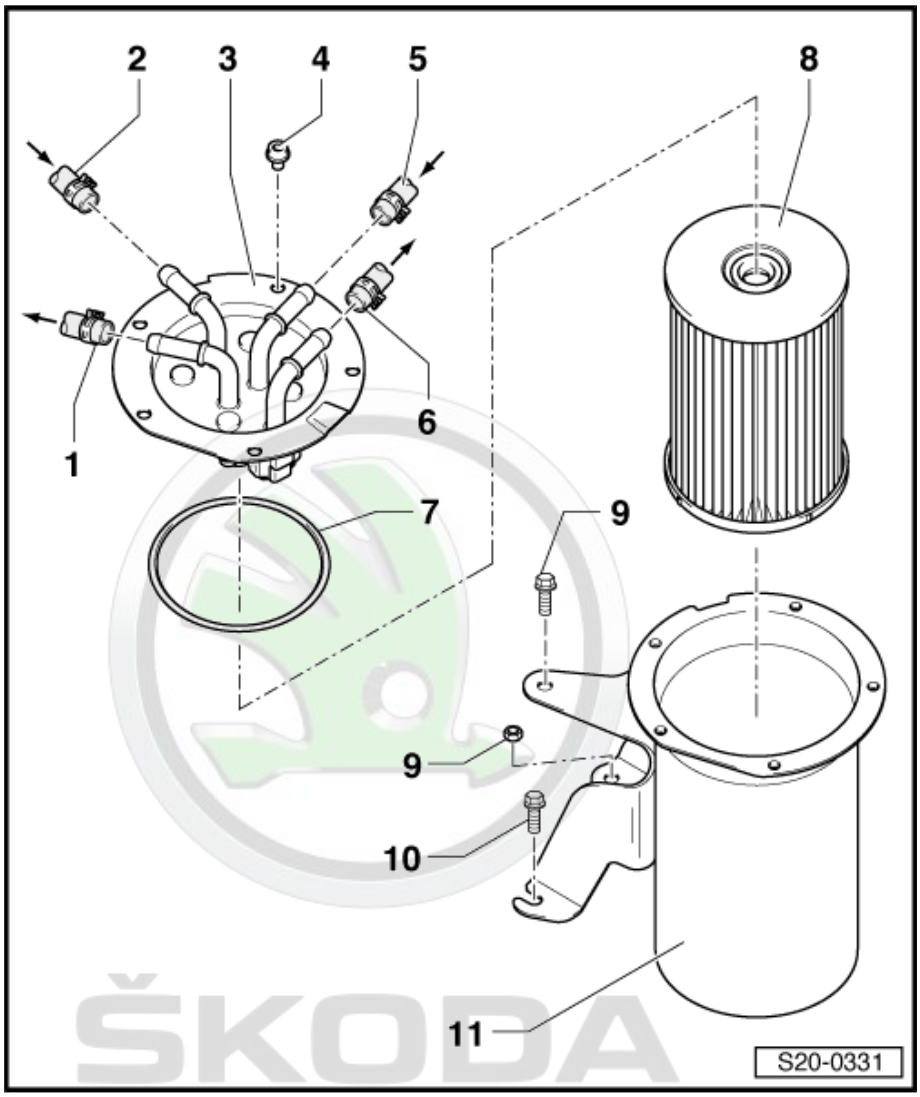
2.3.1 Fuel filter for engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

Note

- ♦ *Before disconnecting the fuel hoses, mark assignment to the supports.*
- ♦ *After installing the fuel filter:*

– Filling and bleeding the fuel system. For this purpose, connect the vehicle diagnosis, measurement and information system - VAS- and carry out the targeted function “bleeding the fuel

system". During this function, the fuel pump is actuated for 180 seconds.



1 - Return-flow hose

- ❑ to fuel tank
- ❑ blue marking and blue inscription
- ❑ is connected on the blue line on the separation point in the engine compartment on the right

2 - Intake hose

- ❑ from fuel tank
- ❑ white marking and white inscription
- ❑ is connected on the black line on the separation point in the engine compartment on the right

3 - Fuel filter - top part

- ❑ raise at the assembly groove using the offset screwdriver - VAS 6543- :

- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti

4 - Screw

- ❑ 5 Nm

5 - Return-flow hose

- ❑ of engine
- ❑ blue marking and blue inscription

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6 - Intake hose

- ❑ to additional fuel pump
- ❑ white marking and white inscription

7 - Sealing ring

- ❑ Replace after disassembly

8 - Fuel filter element

- ❑ Pay attention to change intervals:

- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti

9 - Nut

- ❑ 8 Nm

10 - Screw

- ❑ to remove fuel filter only slacken screw
- ❑ 8 Nm

11 - Fuel filter - lower part

- ❑ with integrated bracket

2.3.2 Fuel filter for engines with identification characters CLCA, CLCB, CLJA

Note

- ♦ *Before disconnecting the fuel hoses, mark assignment to the supports.*
- ♦ *After installing the fuel filter:*

– Filling and bleeding the fuel system. For this purpose, connect the vehicle diagnosis, measurement and information system - VAS- and carry out the targeted function “bleeding the fuel system”. During this function, the fuel pump is actuated for 180 seconds.

1 - Return-flow hose

- ❑ to fuel tank
- ❑ blue marking and blue inscription
- ❑ is connected on the blue line on the separation point in the engine compartment on the right

2 - Intake hose

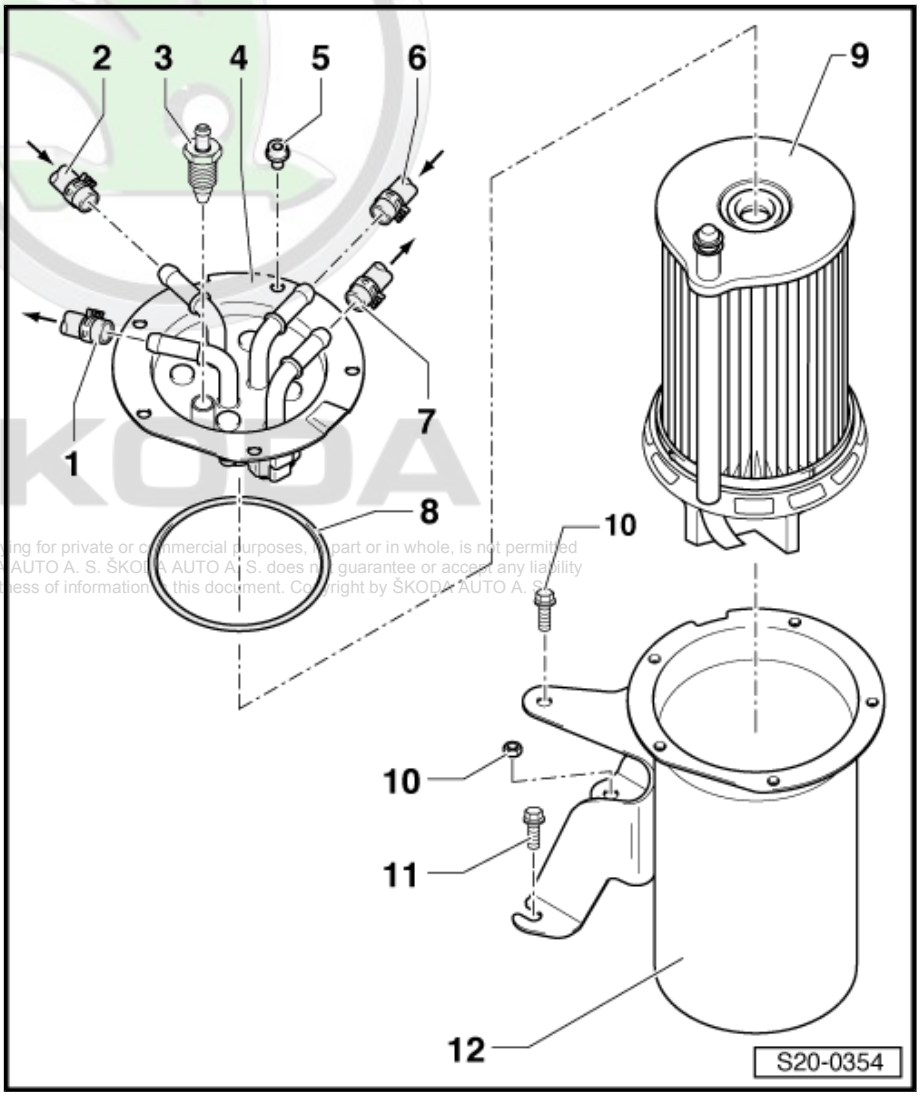
- ❑ from fuel tank
- ❑ white marking and white inscription
- ❑ is connected on the black line on the separation point in the engine compartment on the right

3 - Drain plug

- ❑ Drain fuel filter:
- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti
- ❑ 7 Nm

4 - Fuel filter - top part

- ❑ raise at the assembly groove using the offset screwdriver - VAS 6543- :
- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti



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5 - Screw

- ❑ 5 Nm

6 - Return-flow hose

- ❑ of engine
- ❑ blue marking and blue inscription

7 - Intake hose

- ❑ to additional fuel pump - V393- or to fuel pump 2 - V277-
- ❑ white marking and white inscription

8 - Sealing ring

- ❑ Replace after disassembly

9 - Fuel filter element

- ❑ Change intervals:

- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti

- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ on engines BS-4 with drain pipe, observe the fitting position to the fuel filter - top part -position 4-

10 - Nut

- ❑ 8 Nm

11 - Screw

- ❑ to remove fuel filter only slacken screw and do not release
- ❑ 8 Nm

12 - Fuel filter - lower part

- ❑ with integrated bracket

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2.4 Extract fuel from the fuel tank

Special tools and workshop equipment required

- ♦ Hose adapter , e. g. -V.A.G 1318/16-
- ♦ Adapter , e.g. -V.A.G 1318/17-
- ♦ Auxiliary measuring set, , e. g. -V.A.G 1594 C-
- ♦ Battery
- ♦ Fuel tank

Note

If the fuel pump is defective, suction off fuel using a fuel suction device , e.g. -VAS 5190- .

Note

- ♦ *Safety precautions when working on the fuel supply system*
  ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- ♦ *Observe rules for cleanliness*
  ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Switch off ignition and pull out ignition key.

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

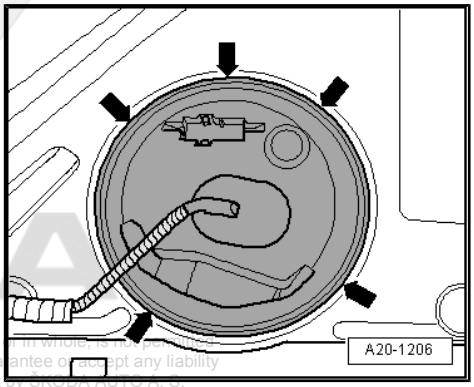
Yeti vehicles

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

Continued for all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

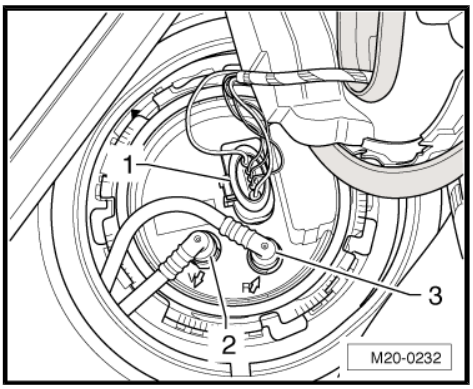
For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must be disconnected additionally.

WARNING

Fuel feed line is pressurised. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching cable connections. Reduce pressure by carefully removing the wiring.

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– Disconnect connector -1- and black feed line -2-. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .



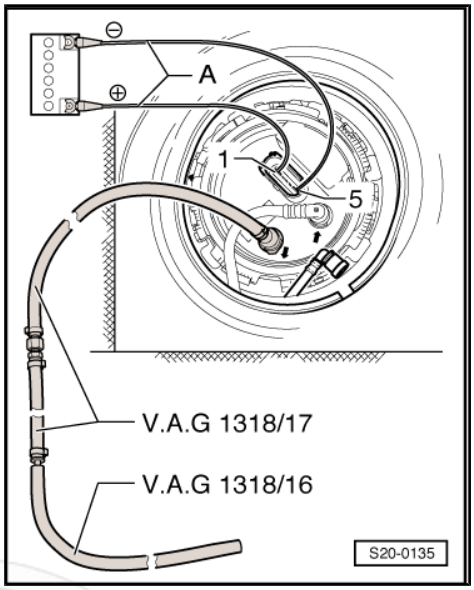
Note

On vehicles with four-wheel drive, the position of the plugs and the fuel lines is different.

– Connect the adapter set - V.A.G 1318/17- and the hose adapter - V.A.G 1318/16- and fit the resulting “drain pipe” onto the feed support of the fuel pump.
– Hold the “drain pipe” in a suitable catch pan for fuel.
– Connect the battery and the contacts of the fuel pump with auxiliary cables -A- from the auxiliary measuring set as follows:

♦ Battery positive terminal (+) to contact -1- of the fuel pump.
♦ Battery negative terminal (-) to contact -5- of the fuel pump.

The fuel pump runs and suctions off fuel.



WARNING

In order to prevent an overflow of fuel, the fuel pump must not run unattended.

2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)

Special tools and workshop equipment required

♦ Wrench for the lock ring - T30101 (3087)-
♦ Protective gloves

Removing

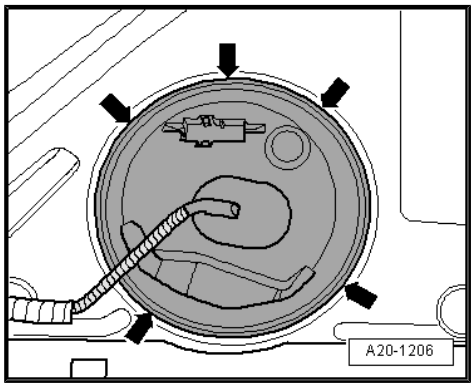
• The fuel tank must not be more than $^{3}/_{4}$ full.

Note

♦ *If necessary drain the fuel tank*
⇒ “2.4 Extract fuel from the fuel tank”, page 196 .
♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
♦ *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

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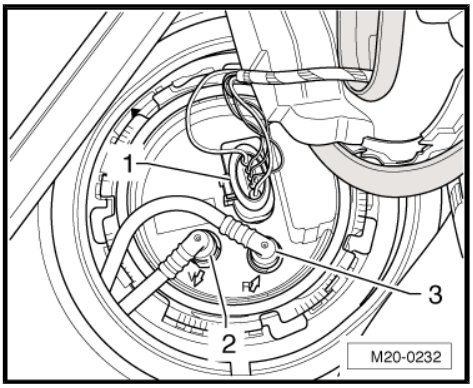
– Switch off ignition and pull out ignition key.
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must be disconnected additionally.

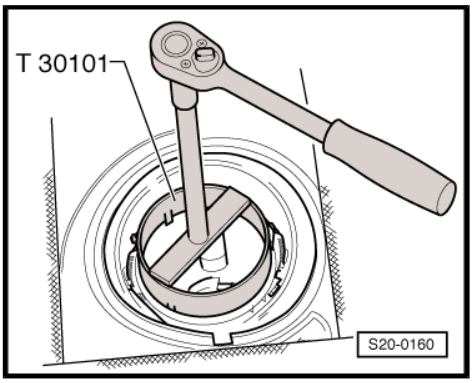
– Disconnect plug -1-, black feed line -2- and blue return line -3-. Unlock the quick coupling and disconnect
⇒ “2.10 Separating push-on couplings”, page 208 .



Note

For vehicles with auxiliary heating the suction line for the dosing pump - V54- must be pulled out additionally (open lower clamp).

– Slacken lock ring with the wrench - T30101- .



Note

When removing and installing, ensure that the float arm of the sender for fuel gauge - G- is not bent.

– Pull the fuel delivery unit and the sealing ring out of the opening of the fuel tank.

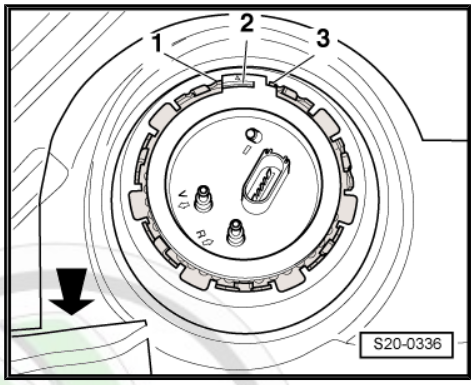
Note

You must empty the old fuel delivery unit before disposing of it if you wish to replace it.

Installing

– Installation is performed in the reverse order, pay attention to the following points:

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Note

- *Insert new dry sealing ring into the opening of the fuel tank.*
- *The gasket ring must only be moistened on the inside with fuel before assembly of the fuel delivery unit.*
- *When installing, do not bend the float arm of the fuel gauge sender - G- .*
- *Observe the fitting location of the fuel delivery unit. The marking -3- on the flange must point against the direction of travel. The fuel delivery unit can only be installed in this position.*
- *Do not interchange feed line and return-flow line.*
- *Tighten the lock ring to a tightening torque ⇒ "2.1 Summary of components - fuel tank with attached parts (Octavia II with front-wheel drive)", page 189 .*
- *Make sure the line connections fit tightly.*
- *After installing the fuel delivery unit, check whether the feed line and the return-flow line are correctly clipped in place on the fuel tank.*

Before starting the engine, the fuel system must be bled as follows:

– Switch on the ignition and only switch it off once the fuel pump has come to a standstill. Repeat this procedure at least »5 times«.

2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)

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Special tools and workshop equipment required

- Wrench for the lock ring - T30101 (3087)-
- Protective gloves

Removing

- The fuel tank must not be more than $^{3}/_{4}$ full.

Note

- *Safety precautions when working on the fuel supply system ⇒ "2.1 Safety precautions when working on fuel supply system", page 4 .*
- *Observe rules for cleanliness ⇒ "3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6 .*

– Switch off ignition and pull out ignition key.

– If necessary drain the fuel tank ⇒ "2.4 Extract fuel from the fuel tank", page 196 .

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

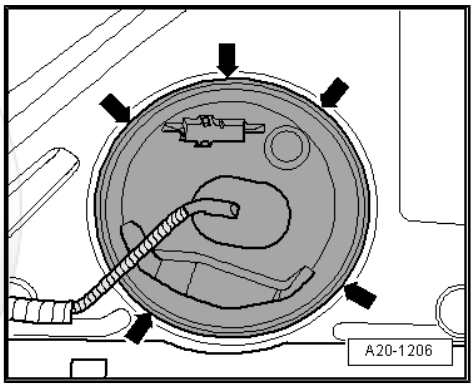
Yeti vehicles

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

Continued for all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.

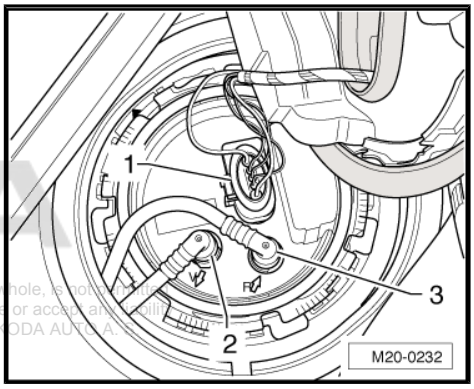


Note

For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must be disconnected additionally.

Vehicles Octavia II

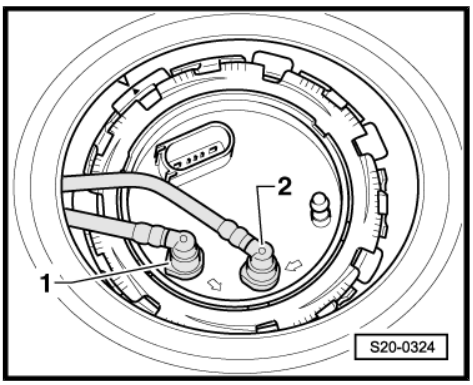
– Disconnect plug -1-, black feed line -2- and blue return line -3-.



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Vehicles Superb II and Yeti

– Disconnect the plug as well as the black feed line -1- and the blue return-flow line -2- from the flange. Unlock the quick coupling and disconnect
⇒ “2.10 Separating push-on couplings”, page 208 .

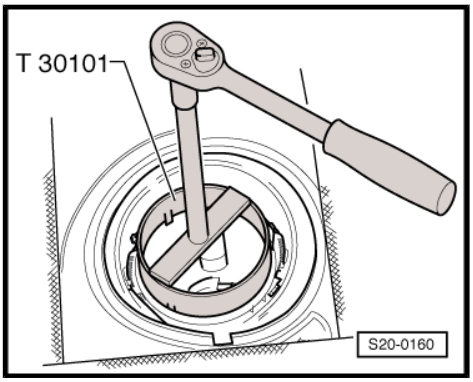


Continued for all vehicles

Note

For vehicles with auxiliary heating the suction line for the dosing pump - V54- must be pulled out additionally (open lower clamp).

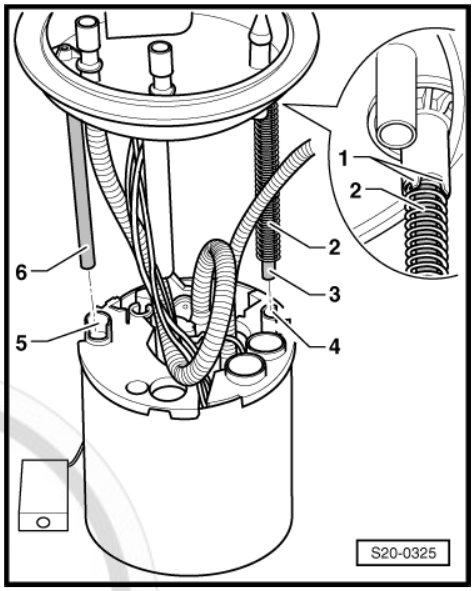
– Open lock ring with the wrench - T30101- .



– Slightly raise the closing flange and check if the spring -2- is still fastened on the flange -1-.

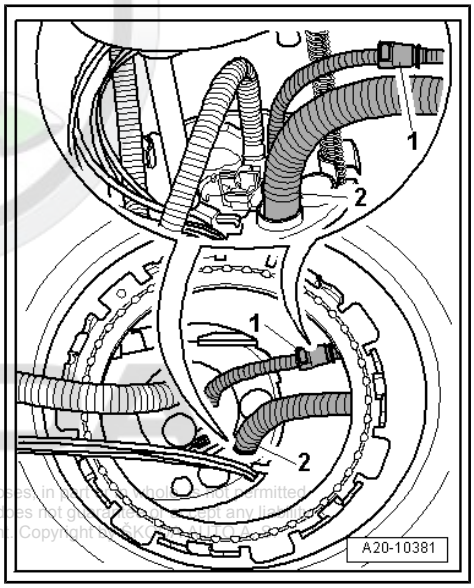
  If the spring -2- is loose on the guide pipe -3-, hold it with your fingers while removing the closing flange.

– Pull closing flange and gasket ring for fuel pump out of the opening of the fuel tank and place to the side with the connected lines.



– Through the opening of the fuel tank, disconnect the fuel line -1- to the vacuum pump by pressing the release button.

– Disconnect the fuel delivery line -2- from the fuel delivery unit.



Note

- *You must wear protective gloves for removing the fuel delivery unit.*
- *Remove fuel pump from the fuel tank so that the electric cables and fuel hoses are not damaged and the float arm of the sender for fuel gauge display - G- is not bent.*
- *You must empty the old fuel delivery unit before disposing of it if you wish to replace it.*

– Pull the fuel delivery unit out of the opening of the fuel tank.

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Installing

The installation of the fuel delivery unit occurs in the reverse order. However, pay attention to the following:

– Insert the fuel delivery unit into the fuel tank with the closing flange placed to the side. Do not bend the float arm of the fuel gauge sender unit - G- while doing so.

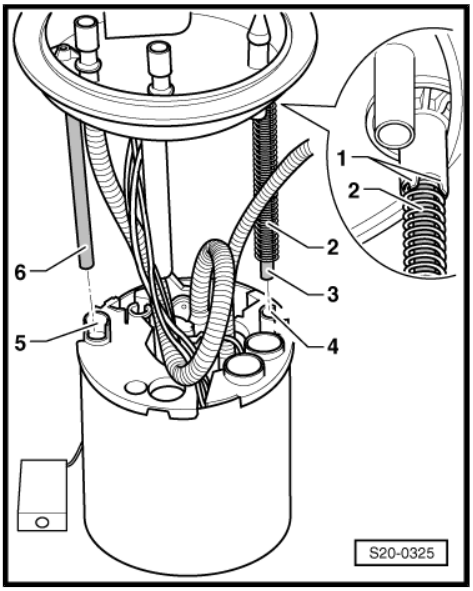
– Install the fuel delivery unit and the fuel line.

– Insert the dry sealing ring for the flange into the opening of the fuel tank and moisten only from the inside with fuel for installing the closing flange.

- The spring -2- must be fastened to the retaining lugs -1- of the closing flange.

– First of all guide the guide pipe -3- into the guide opening -4-.

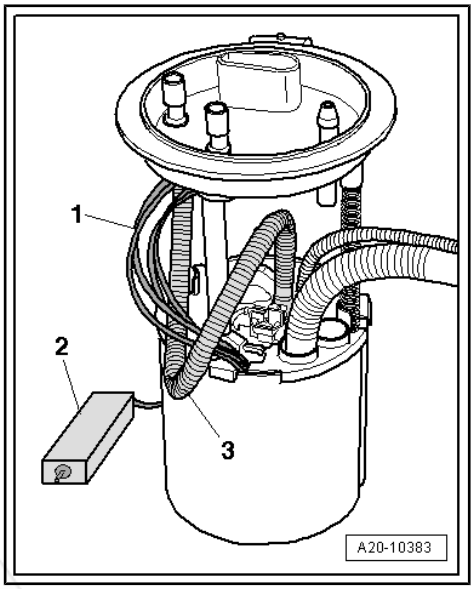
– Then lower the closing flange in such a way that the guide pipe -6- locks into the guide bore -5-.



Note

Pay attention that the electrical cables -1- and the fuel feed line -3- are routed according to the illustration and the float arm -2- is not blocked.

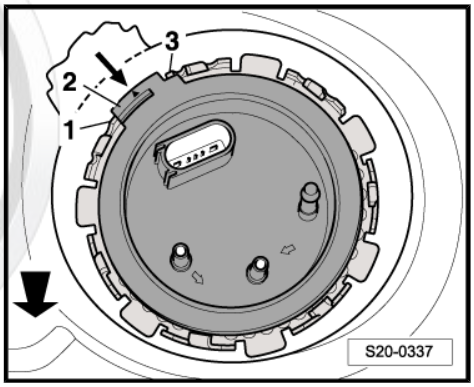
– Press the closing flange down and bring it into the installation position.



- The peg -2- at the closing flange must be located between the pegs -1- and -3-.

The -arrow- shows the direction of travel.

– Tighten the lock ring to 110 Nm.



Note

- *Do not interchange feed line and return-flow line.*
- *Make sure the fuel lines fit tightly.*
- *After installing the fuel delivery unit, check whether the feed line and the return-flow line are still clipped in place on the fuel tank.*

Before starting the engine, the fuel system must be bled as follows:

– Switch on the ignition and only switch it off once the fuel pump has come to a standstill. Repeat this procedure at least »5 times«.

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2.7 Removing and installing the fuel gauge sender - G-

Fuel gauge sender - G- type 1

Removing

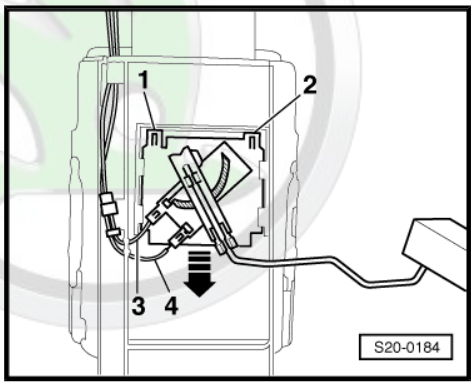
– Remove fuel delivery unit:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

– Unlatch and disconnect lines -3- and -4-.

– Raise securing tabs -1- and -2- with a screwdriver and remove the fuel gauge sender - - downwards -arrow-.



Installing

– Insert the fuel gauge sender - G- into the guides on the fuel delivery unit and press upwards until it engages.

– Connect plug of lines and check for correct position of the sender.

– Install fuel delivery unit:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

Fuel gauge sender - G- type 2

Removing

– Remove fuel delivery unit:

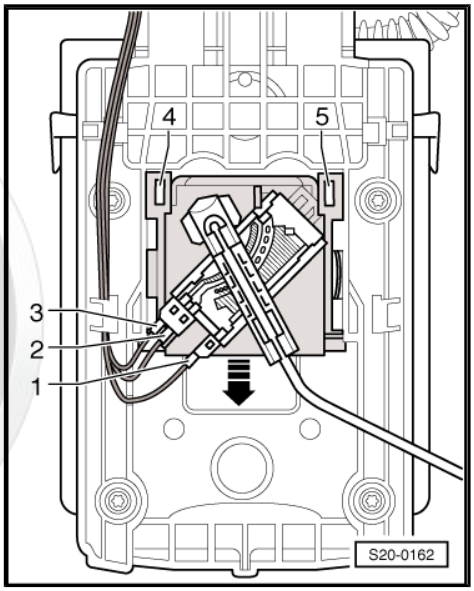
♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

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– Unlatch and disconnect the plug connection of the lines -1- (brown), -2- (blue) and -3- (black).

– Raise securing tabs -4- and -5- with a screwdriver and remove the fuel gauge sender - - downwards -arrow-.



Installing

– Insert the fuel gauge sender - G- into the guides on the fuel delivery unit and press upwards until it engages.

– Connect the wiring and check correct installation of the plug.

– Install fuel delivery unit:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

Fuel gauge sender - G- type 3

Removing

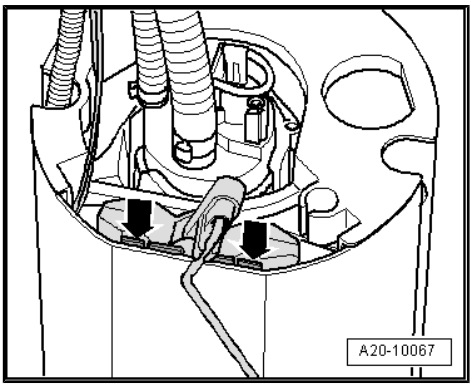
– Remove fuel delivery unit:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

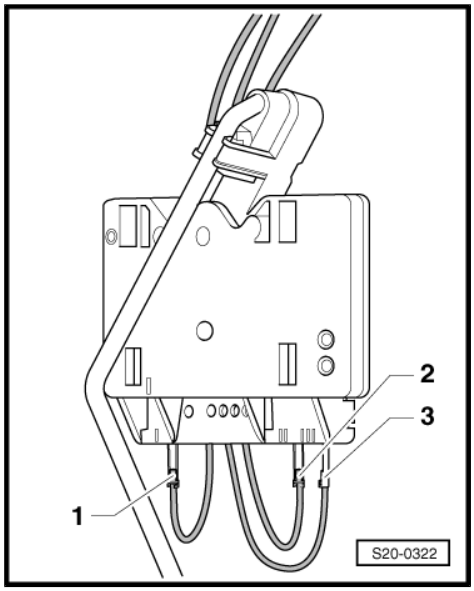
♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

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– Unlock the securing tabs -arrows- using a screwdriver and pull the fuel gauge sender - G- up and out.



– Unlatch and disconnect the plugs of the electrical cables -1- (brown), -2- (blue) and -3- (black).



Installing

– Connect the wiring and check correct installation of the plug.

– Insert the fuel gauge sender - G- into the guides on the fuel delivery unit and press down until it engages.

– Install fuel delivery unit:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

2.8 Removing and installing fuel gauge sender 2 - G169-

Special tools and workshop equipment required

♦ Wrench for the lock ring - T30101 (3087)-

♦ Protective gloves

• The fuel tank must not be more than $^1/_2$ full.

Note

♦ *Where necessary, empty the fuel tank*
⇒ “2.4 Extract fuel from the fuel tank”, page 196 .

♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

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♦ *Observe the regulations concerning cleanliness when working on the fuel supply/injection system*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

♦ *Make sure that the float arm of the fuel gauge transmitter 2 - G169- is not bent.*

Removing

Switch off ignition and pull out ignition key.

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

Yeti vehicles

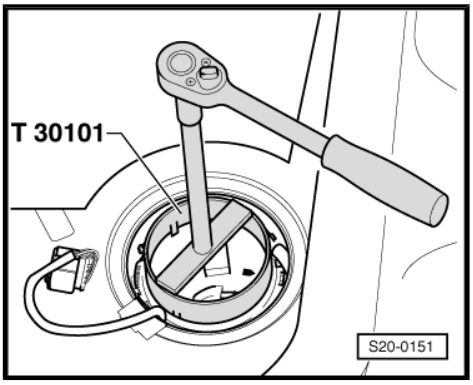
– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

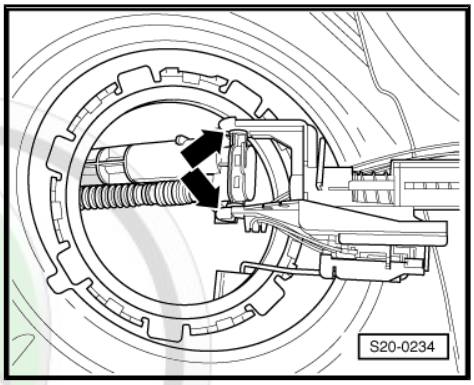
Continued for all vehicles

– Remove left cover and disconnect plug from fuel gauge sender 2 - G169- .

– Unlock lock ring at flange with wrench -T30101- .



– Pull lightly Fuel gauge transmitter 2 - G169- out of the opening of the fuel tank, unlock the securing tabs -arrows- and disconnect the pump.



– Remove gasket ring.

Installing

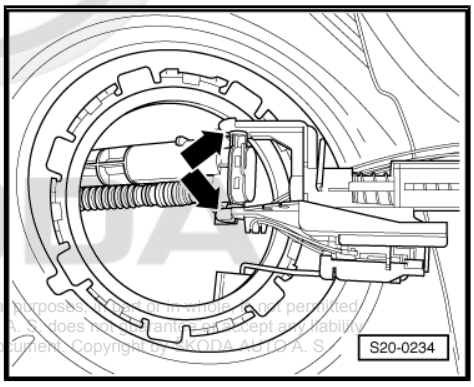
– Installation is carried out in the reverse order. Pay attention to the following:

WARNING

When installing do not bend the float arm of the fuel gauge transmitter 2 - G169- .

– Insert the fuel gauge sender 2 - G169- into the fuel tank.

– Fit the suction jet pump in the fuel tank onto the fuel gauge sender 2 - G169- and push it in until the securing tabs -arrows- latch into position.



– Insert dry sealing ring for the flange into the opening of the fuel tank and only moisten the inside (towards the flange) with fuel.

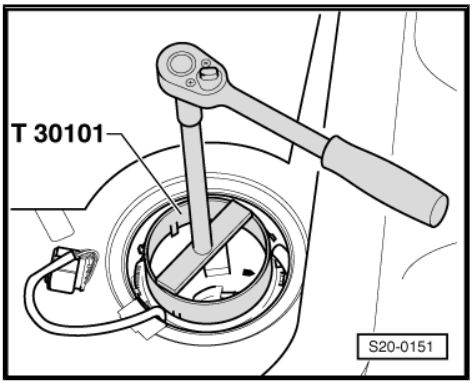
– Check the fitting position ⇒ page 193 and insert the flange of the fuel gauge sender 2 - G169- into the opening of the fuel tank.

– Check correct positioning of sealing ring.

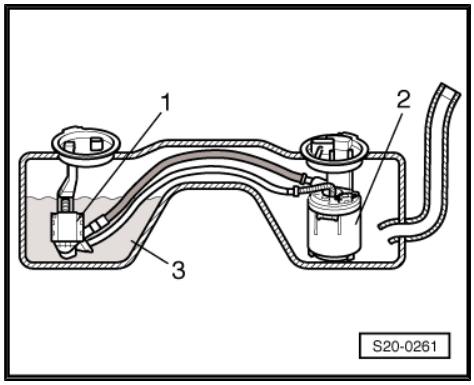
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– Tighten the lock ring with wrench -T30101- to 110 Nm.

– Fit on plug and install left cover.



2.9 Removing and installing suction jet pump



Note

- *The version of the fuel tank, which (on vehicles with four-wheel drive) consists of the left and right chamber, requires that the fuel from the left chamber -3- is pumped out of the area of the fuel gauge transmitter 2 - G169- to the fuel delivery unit -2- with a suction jet pump -1-.*
- *You must check the suction jet pump if the engine stops because of lack of fuel, although the fuel gauge still indicates that the fuel tank is 1/4 full.*

Work procedure

– Remove fuel delivery unit
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .

– Remove fuel gauge sender 2 - G169-
⇒ “2.8 Removing and installing fuel gauge sender 2 G169 ”, page 206 .

– Pull out the suction jet pump from the side of the fuel gauge transmitter 2 - G169- .

– Check if the fuel lines are firmly connected to the suction jet pump and are not damaged.

– Check the suction jet pump additionally for possible contamination or blockage.

2.10 Separating push-on couplings

Special tools and workshop equipment required

- Lever - T10468-

Assign quick couplings

Note

Quick couplings of fuel lines, vacuum and ventilation lines are colour marked. Either the colour point at the quick coupling or the release button has the corresponding colour.

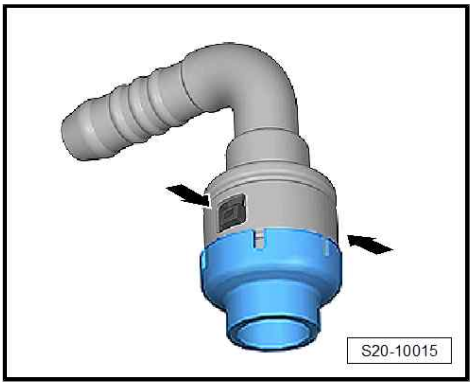
Push-on coupling	Colour coding on the quick coupling
fuel feed line	Black
Fuel return-flow line	Blue
Breather	White, beige
Vacuum	Green

WARNING

Fuel feed line is pressurised. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

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Version 1



Note

When the push-fit coupling is fitted with a plastic circlip, leave it inserted when removing and installing the quick release.

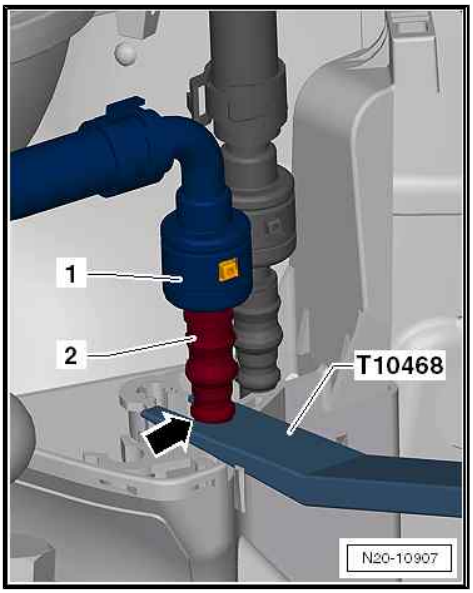
Quick coupling with release buttons -arrows- on right and left.

Opening

The separation point -1- in the engine compartment must be held in place.

– Insert the lever - T10468- between the heat shield and the stop -arrow- of the fuel line -2- and hold.

Continued for all separation points.



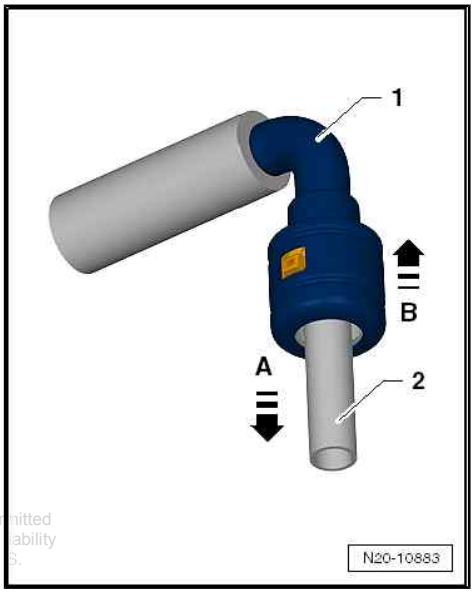
– Press the quick coupling -1- in direction of arrow -A-.

– Press the release buttons and remove the quick coupling -1- from the fuel line -2- in direction of the arrow -B-.

Pay attention to the assignment of the colours when installing ⇒ page 208 .

The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!

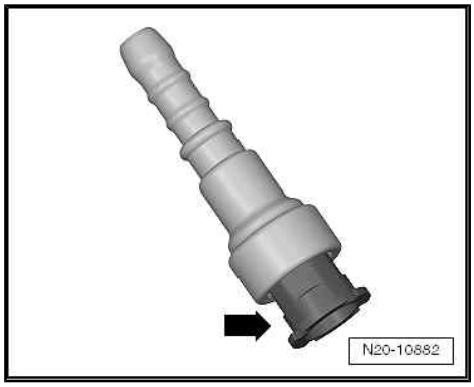


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Version 2

Push-on coupling with pull-release mechanism -arrow-.

Opening

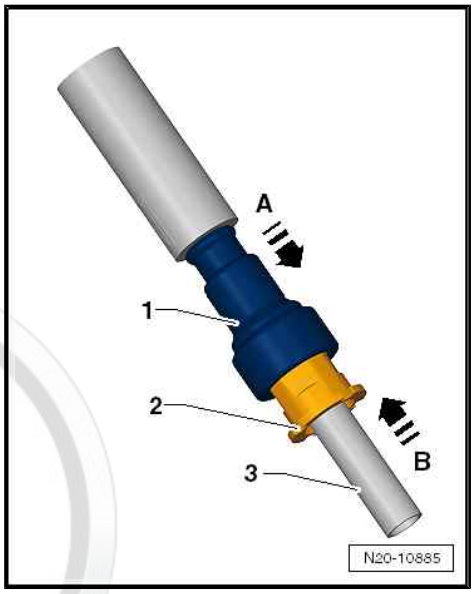


– Press the quick coupling -1- in direction of arrow -A-.
– Pull pull-release mechanism -2- in direction of arrow -B-.
– Remove the quick coupling -1- from the fuel line -3- in direction of the arrow -B-.

Pay attention to the assignment of the colours when installing ⇒ page 208 .

The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!



Version 3

Quick coupling with front button -arrow-.

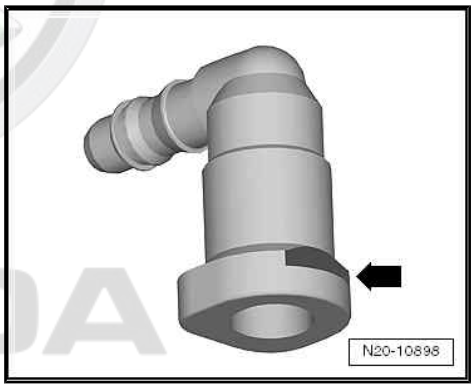
Opening

– Press release button -arrow- and pull off quick couplings.

Pay attention to the assignment of the colours when installing ⇒ page 208 .

The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!



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Version 4

Quick coupling with release buttons -arrows- on right and left.

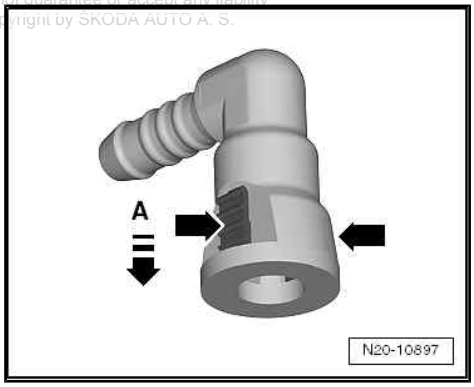
Opening

– Press the quick coupling in direction of arrow -A-.
– Press release buttons -arrow- and detach quick coupling.

Pay attention to the assignment of the colours when installing ⇒ page 208 .

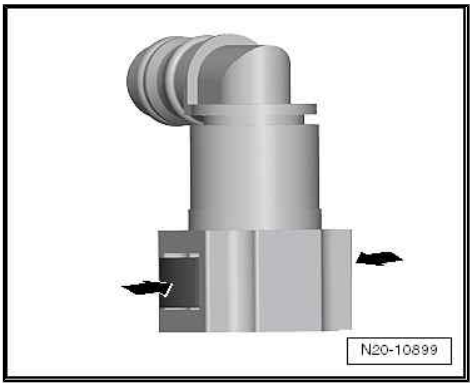
The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!



Version 5

Quick coupling with release buttons -arrows- on right and left.



Opening

– Press release buttons -arrow- and detach quick coupling.

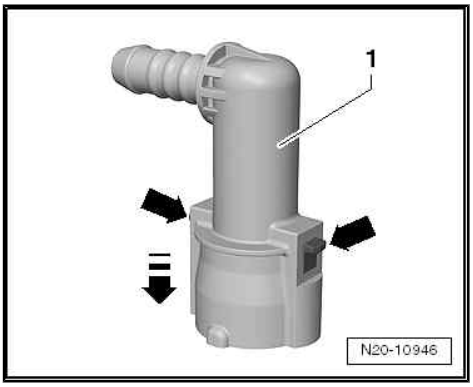
Pay attention to the assignment of the colours when installing ⇒ page 208 .

The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!

Version 6

Push-on coupling with release buttons -arrows- on front and rear.



Opening

– Press push-on coupling -1- in direction of arrow and hold pressed.

– Press release buttons -arrow- and detach quick coupling.

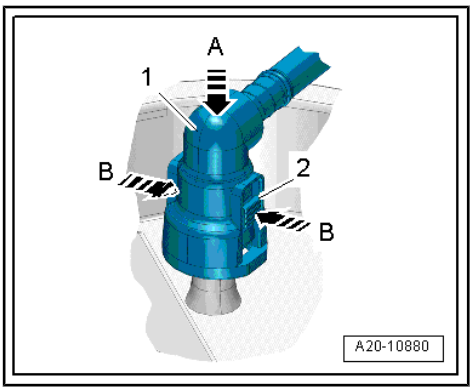
Pay attention to the assignment of the colours when installing ⇒ page 208 .

The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!

Version 7

Quick coupling -1- with release buttons -arrows- right and left.



– Press quick coupling -1- in direction of arrow -A- and hold pressed.

– Press the release buttons -2- in direction of arrow -B- and remove the quick coupling -1-.

Pay attention to the assignment of the colours when installing ⇒ page 208 .

The quick coupling must »audibly« click in place when securing it.

– Check the quick couplings for firm seating by pulling in the opposite direction!

2.11 Removing and installing fuel tank (Octavia II with front-wheel drive)

Special tools and workshop equipment required

♦ Engine/gearbox jack , e.g. -V.A.G 1383 A-

Removing

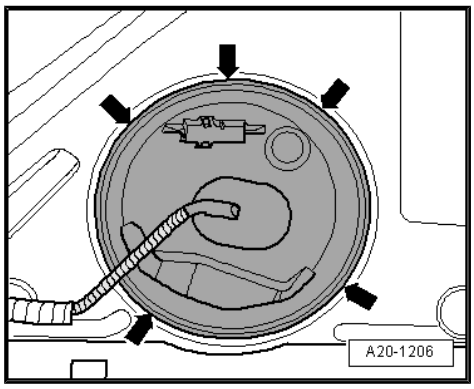
• The fuel tank must be empty for weight reasons when removing it.

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Note

- *Safety precautions when working on the fuel supply system* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe the regulations concerning cleanliness when working on the fuel supply/injection system* ⇒ *"3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

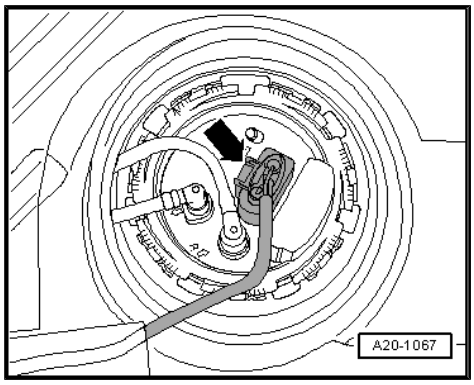
– Drain the fuel tank ⇒ "2.4 Extract fuel from the fuel tank", page 196 .
– Switch off ignition and pull out ignition key.
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



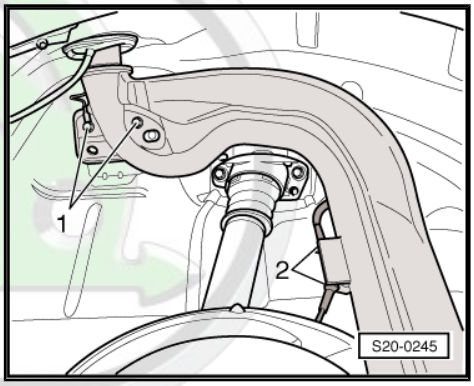
Note

On vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be disconnected.

– Disconnect the plug -arrow- for the fuel delivery.
– Open the fuel tank cap and clean around the fuel filler neck.
– Unscrew the cap from the fuel filler neck.
– Close the opening of the fuel filler neck with a clean foam piece, so that no dirt can penetrate.
– Unscrew right rear wheel ⇒ Chassis; Rep. gr. 44 .
– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .



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– Remove screws -1- for filler neck on the body.
– Unclip the wiring loom from the holder -2- at the top and bottom of the filler neck.
– Remove rear tunnel bridge ⇒ “1.2 Summary of components - Middle and rear part of the exhaust system”, page 320 .
– Slacken front clamping sleeve at exhaust sleeve and push clamping sleeve to the rear.
– Loosen the middle and rear part of the exhaust system from all the retaining straps.
– Slightly lower the middle and rear part of the exhaust system and tie with wire to the body.
– Disconnect the fuel feed and the fuel return-flow line on the front right of the fuel tank. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .

Note

On vehicles with auxiliary heating, the fuel line for the dosing pump - V54- must also be disconnected.

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– Unscrew tensioning strap.
– Support the fuel tank using the engine/gearbox jack - V.A.G 1383 A- .
– Unscrew securing bolts.
– Lower the fuel tank.

Installing

Installation occurs in reverse order to removal. Pay attention to the following:

♦ Install the fuel lines without kinks.
♦ Do not mix-up the fuel feed line (black) and the fuel return-flow line (blue).
♦ Make sure the fuel line connections fit tightly.
♦ Check feed line and return-flow line at fuel tank for firm seating.
♦ Check earth connection of fuel tank/body at filler neck.

Before starting the engine, the fuel system must be bled as follows:

– Switch on the ignition and only switch it off once the fuel pump has come to a standstill. Repeat this procedure at least »5 times«.

2.12 Removing and installing fuel tank (Superb II, Yeti, Octavia II with four-wheel drive)

Special tools and workshop equipment required

♦ Engine/gearbox jack , e.g. -V.A.G 1383 A-

• The fuel tank must be empty for weight reasons when removing it.

Removing

Note

- *Safety precautions when working on the fuel supply system* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness* ⇒ *"3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

– Drain the fuel tank ⇒ "2.4 Extract fuel from the fuel tank", page 196 .

– Switch off all electrical components and withdraw key from ignition lock.

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

Yeti vehicles

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

Continued for all vehicles

– Remove the cover from the fuel delivery unit and the cover for the flange with the fuel gauge sender 2 - G169- .

Note

On vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be disconnected.

– Disconnect the plug from the fuel delivery unit and from the flange with the fuel gauge sender 2 - G169- -arrow -.

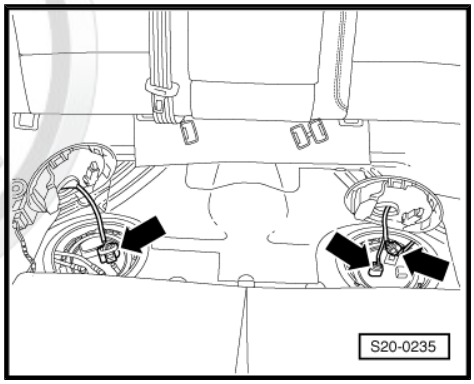
– Open the fuel tank cap and clean around the fuel filler neck.

– Unscrew the cap from the fuel filler neck.

– Close the opening of the fuel filler neck with a clean foam piece, so that no dirt can penetrate.

– Unscrew right rear wheel ⇒ Chassis; Rep. gr. 44 .

– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

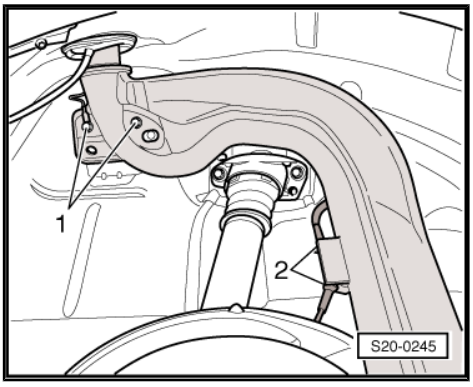


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– Remove screws -1- for filler neck on the body.

– Unclip the electrical cable from the bracket -2- at the top and bottom of the filler neck.

– Disconnect the fuel feed and the fuel return-flow line on the front right of the fuel tank. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .



Note

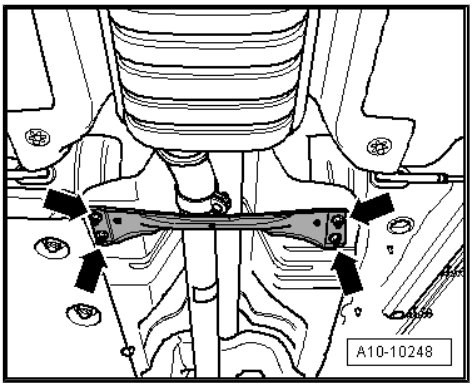
On vehicles with auxiliary heating, the fuel line for the dosing pump - V54- must also be disconnected.

– Remove tunnel bridge -arrows-.

– Remove the rear silencer:

♦ Summary of components of rear part of exhaust system ⇒ “1.2 Summary of components - Middle and rear part of the exhaust system”, page 320 .

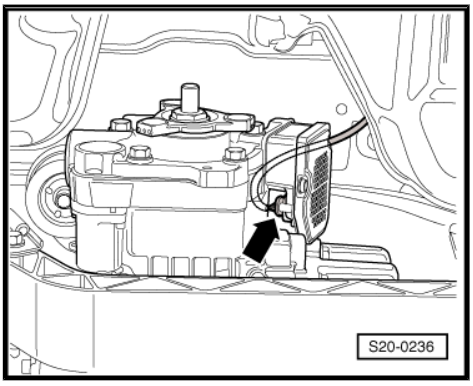
♦ Summary of components for vehicles Superb II with engines with identification characters CFFB, CFGB ⇒ “1.2.3 Summary of components - Middle and rear part of the exhaust system (Superb II with engine identification characters CFFB, CFGB)”, page 323 .



Vehicles with four-wheel drive

– Remove propshaft ⇒ Chassis; Rep. gr. 39 .

– Disconnect plug -arrow- at four-wheel drive control unit - J492- .



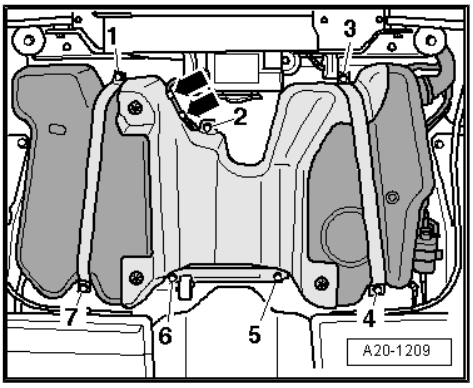
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Continued for all vehicles

– First unscrew the screws -2-, -5- and -6-.

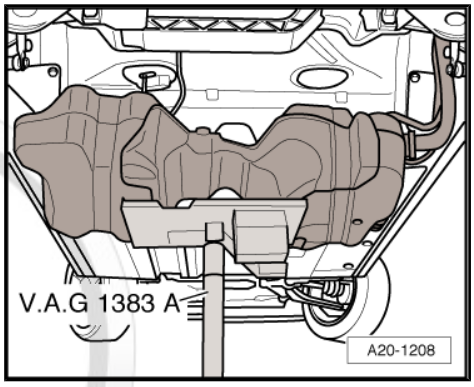
– Support the fuel tank using the engine and gearbox jack - V.A.G 1383 A- .

– Unscrew the screws for the tensioning straps -1-, -3-, -4- and -7-.



– Slightly lower the fuel tank using the engine and gearbox jack - V.A.G 1383 A- .

– Then remove the fuel tank from the engine/gearbox jack - V.A.G 1383 A- and pull through the filler neck between the body and the rear axle with the help of a second mechanic.



Installing

Installation occurs in reverse order to removal. Pay attention to the following:

Note

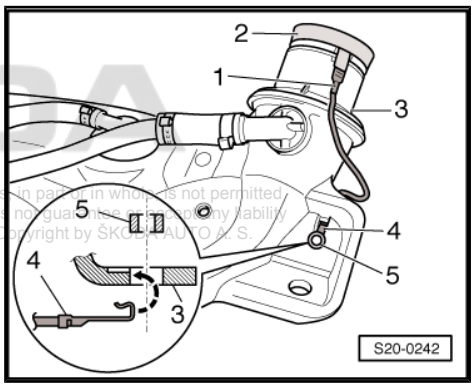
- *Install the fuel lines without kinks.*
- *Do not mix-up the fuel feed line (black) and the fuel return-flow line (blue).*
- *Make sure the fuel line connections fit tightly.*
- *Check feed line and return-flow line at fuel tank for firm seating.*

– Check earth connection of fuel tank/body at filler neck and if necessary remove corrosion.

• The plug -1- on the metal plate ring -2- must be pushed on firmly.

• The contact tab -4- must be hung on the fuel tank -3- and secured with the spacer bush -5-.

– Pull through the filler neck between the body and the rear axle with the help of a second mechanic. Then position the fuel tank onto the engine/gearbox jack - V.A.G 1383 A- .



Before starting the engine, the fuel system must be bled as follows:

– Switch on the ignition and only switch it off once the fuel pump has come to a standstill. Repeat this procedure at least »5 times«.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Fixing screws of the fuel tank
⇒ “2.2 Summary of components - fuel tank with attached parts (Superb II, Yeti, Octavia II with four-wheel drive)”, page 191 .

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2.13 Removing and installing additional fuel pump - V393- or fuel pump 2 - V277-

Note

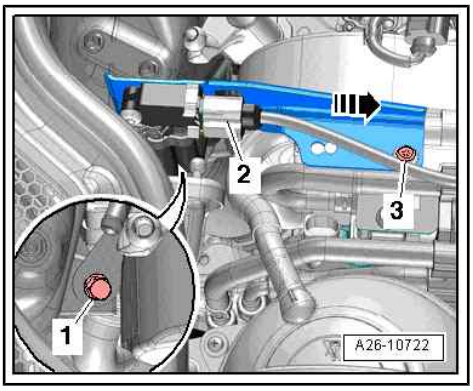
- *Safety precautions when working on the fuel supply system ⇒ "2.1 Safety precautions when working on fuel supply system", page 4 .*
- *Observe rules for cleanliness ⇒ "3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6 .*
- *The additional fuel pump - V393- is installed in the vehicles Octavia II and Superb II and the fuel pump 2 - V277- is installed in the vehicles Yeti.*
- *The additional fuel pump - V393- or the fuel pump 2 - V277- is only supplied as a spare part complete with the bracket ⇒ ETKA - Electronic Catalogue of Original Parts .*

Removing

Engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

– Disconnect plug -2- at differential pressure indicator - G505- .

– Screw out screw -3- and remove bracket with differential pressure indicator - G505- from the bracket of the additional fuel pump in -direction of arrow-.



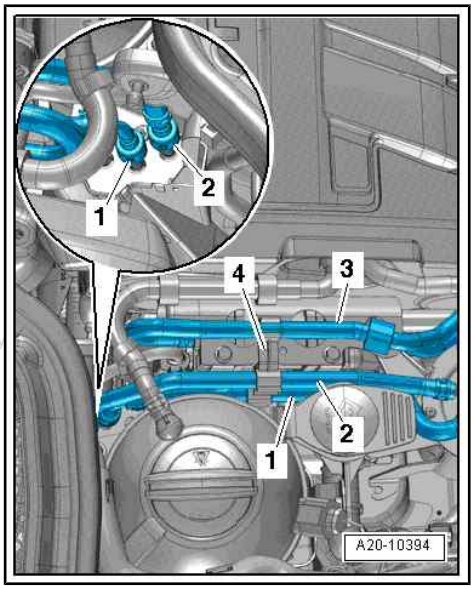
Caution

Risk of damage!

- ***The differential pressure indicator - G505- is very sensitive. It must not touch somewhere when laying it down.***

– Place the bracket with the differential pressure indicator - G505- to the rear.

– Unhook the fuel hoses -1-, -2- and -3- on the bracket and remove the bracket -4-.

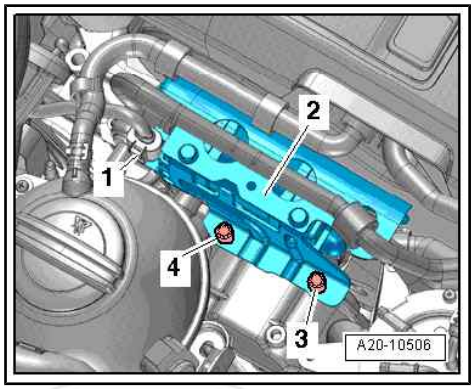


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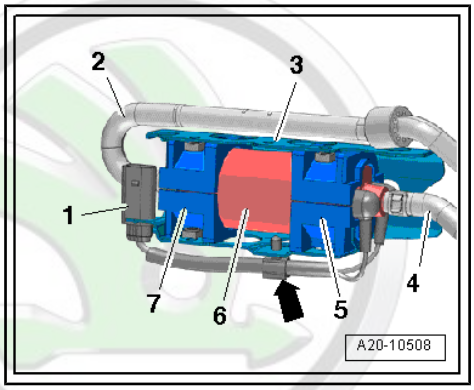
Continue for all engines

– Disconnect plug connection -1-.

– Unscrew screws -3- and -4- and remove bracket -2- with additional fuel pump.



– Open the spring strap clamps and remove the fuel hoses -2- and -4-.



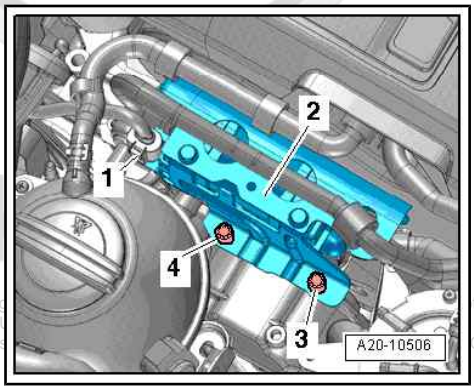
Installing

Assembly is carried out in the reverse order. When installing, observe the following:

– Tighten screws -3- and -4- to 20 Nm.

Before starting the engine, however after replacing the additional fuel pump - V393- or the fuel pump 2 - V277- , the fuel system must be bled as follows:

– Switch on the ignition and only switch it off once the fuel pump has come to a standstill. Repeat this procedure at least »5 times«.



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3 inspecting fuel pump

⇒ “3.1 Checking function and voltage supply of fuel pump”, page 219

⇒ “3.2 Test feed pressure of fuel pump”, page 220

⇒ “3.3 Check the fuel flow rate of the fuel pump”, page 222

⇒ “3.4 Check voltage consumption of the fuel pump”, page 225

⇒ “3.5 Check additional fuel pump V393 or fuel pump 2 V277 ”, page 226

3.1 Checking function and voltage supply of fuel pump

Special tools and workshop equipment required

- Auxiliary measuring set, , e. g. -V.A.G 1594 C-

Test conditions

- Battery voltage at least 12 V
- Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- All electrical consumers such as the light and rear window heater must be switched off.

Test sequence

Note

- *Safety precautions when working on the fuel supply system ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .*
- *Observe rules for cleanliness ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .*

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

Yeti vehicles

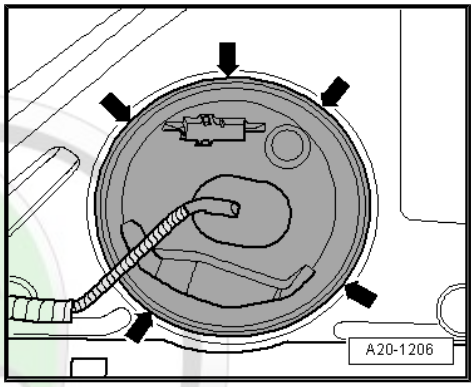
– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

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Continued for all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must be disconnected additionally.

– Switch on the ignition.

• The fuel pump must be heard to start running.

– Switch off ignition.

If the fuel pump does not run:

– Continuing searching for faults using a multimeter ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

3.2 Test feed pressure of fuel pump

Special tools and workshop equipment required

♦ Pressure gauge - VAS 6551-

♦ Hose adapter - VAS 6551/1-

♦ Hose adapter - VAS 6551/2-

Test conditions

• Battery voltage at least 12 V

• Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

• All electrical consumers such as the light and rear window heater must be switched off.

Test sequence

Note

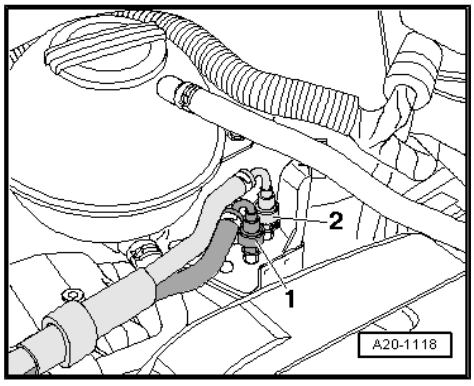
♦ *Safety precautions when working on the fuel supply system* *⇒ "2.1 Safety precautions when working on fuel supply system", page 4* .

♦ *Observe rules for cleanliness* *⇒ "3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

– Detach the fuel feed line -2-, to do so press in the circlip. Unlock the quick coupling and disconnect ⇒ "2.10 Separating push-on couplings", page 208 .

– Connect the pressure gauge - VAS 6551- with hose adapter - VAS 6551/1- and -VAS 6551/2- to the open ends of the fuel feed line.

– Switch on the pressure gauge - VAS 6551- by pressing the button `On/Off`.



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– Open the shut-off cocks “A” and “B” of the pressure gauge and close the shut-off cock “C”.

– Start engine and run in idle.

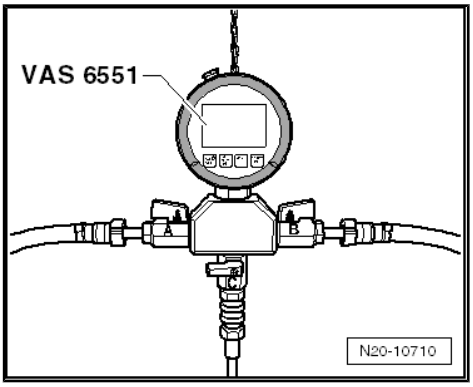
– Close the shut-off cock “B” for maximum 15 seconds and during this period, read off the pressure at the pressure gauge - VAS 6551- .

• Specified value: at least 0,05 MPa (0,5 bar).

– If the injection pressure drops temporarily, replace the fuel delivery pump:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198 .

♦ Superb II, Yeti and vehicles with four-wheel drive Octavia II
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200 .



If the specified values are reached:

– In the event of handling problems, replace the fuel filter, in order to avoid blockage of the fuel filter.

If the specified values are not reached:

For the vehicles Octavia II, Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

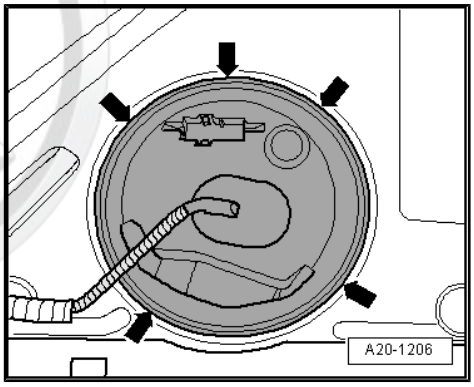
For the vehicles Yeti

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

For all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



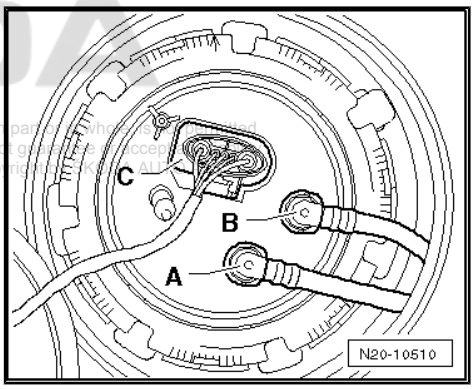
Note

For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be disconnected.

– Detach the black feed line -A- from the fuel pump. Unlock the quick coupling and disconnect
⇒ “2.10 Separating push-on couplings”, page 208 .

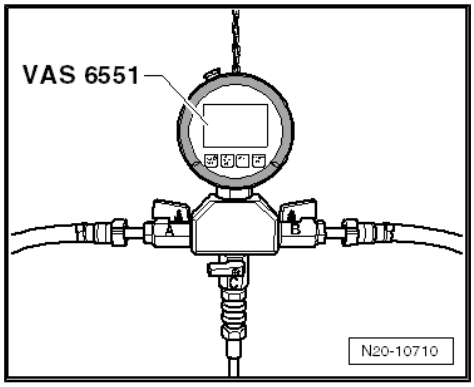
– Connect the pressure gauge - VAS 6551- with hose adapter - VAS 6551/1- and -VAS 6551/2- to the open ends of the fuel feed line and connect the fuel pump.

– Switch on the pressure gauge - VAS 6551- by pressing the button On/Off.



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– Open the shut-off cocks “A” and “B” of the pressure gauge and close the shut-off cock “C”.
– Start engine and run in idle.
– Close the shut-off cock “B” for maximum 15 seconds and during this period, read off the pressure at the pressure gauge - VAS 6551- .
• Specified value: at least 0,05 MPa (0,5 bar).



If the nominal values are again not reached:

– Check the fuel flow rate of the fuel pump
⇒ “3.3 Check the fuel flow rate of the fuel pump”, page 222 .

Note

After the assembly, check if all the quick couplings are correctly locked in place by pulling on them!

3.3 Check the fuel flow rate of the fuel pump

Check with the vehicle diagnosis, measurement and information system - VAS-

Note

For checking the fuel flow rate of the fuel pump, the procedure with the remote control - V.A.G 1348/3A- can also be used
⇒ page 223 .

Special tools and workshop equipment required

♦ Measuring vessel

Test conditions

• Battery voltage at least 12.5 V
• Fuel filter OK.
• Fuel tank at least $^1/_2$ full.
• Ignition off.

Test sequence

Note

♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

♦ *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

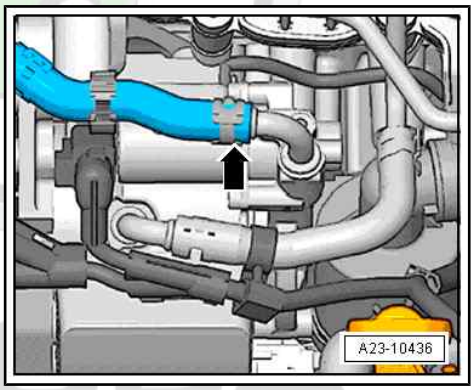
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

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WARNING

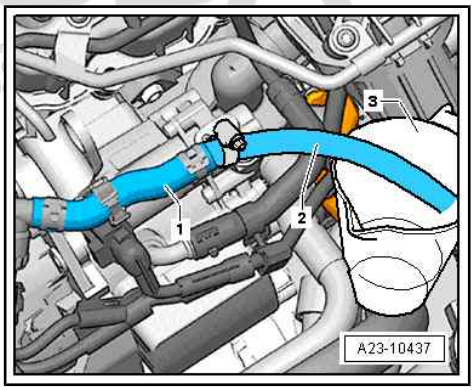
Fuel feed line is pressurised. Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully releasing the connection point.

– Detach the fuel feed line -arrow- from the high pressure pump.



– Hold the fuel feed line -1- (lengthened with a suitable hose -2-) in a measuring vessel -3-.
– Connect vehicle diagnosis, measurement and information system - VAS- and carry out the function “test fuel pump”.

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Note

The fuel pump is activated for 30 seconds.

- Specified value of minimum fuel delivery volume in 30 seconds: min. 600 ml

If the minimum fuel delivery volume is not reached, the following faults may be present:

- Battery voltage too low.
- Fuel lines crimped, carry out a visual inspection.
- Fuel filter is clogged.
- There is a leak in the fuel system, check for tightness.
- Fuel pump defective: check
⇒ “3 inspecting fuel pump”, page 219 .

Checking with the remote control - V.A.G 1348/3A-

Special tools and workshop equipment required

- Remote control , e.g. -V.A.G 1348/3A-
- Auxiliary measuring set, , e. g. -V.A.G 1594C-
- Adapter , e.g. -V.A.G 1318/16-
- Adapter , e.g. -V.A.G 1318/17-
- Measuring vessel

Test conditions

- Battery voltage at least 12 V
- Fuel temperature 15…30 °C.

- Fuel tank must be at least $^1/_4$ full.

Test sequence

Note

- *Safety precautions when working on the fuel supply system* ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Observe rules for cleanliness* ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Unscrew the cap from the fuel filler neck.

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

Yeti vehicles

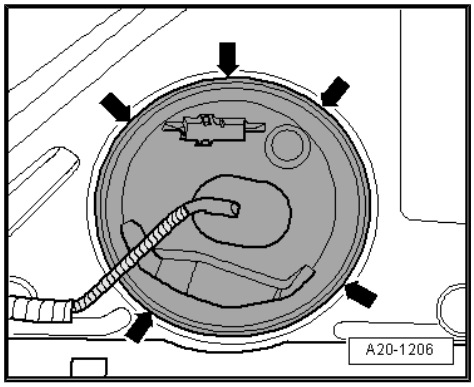
– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

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– Remove floor covering under the rear seats.

Continued for all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must be disconnected additionally.

– Disconnect the plug for the fuel delivery unit.

– Connect remote control - V.A.G 1348/3A- with connection lines from measuring tool set to contact -1- of the fuel pump and to battery positive terminal.

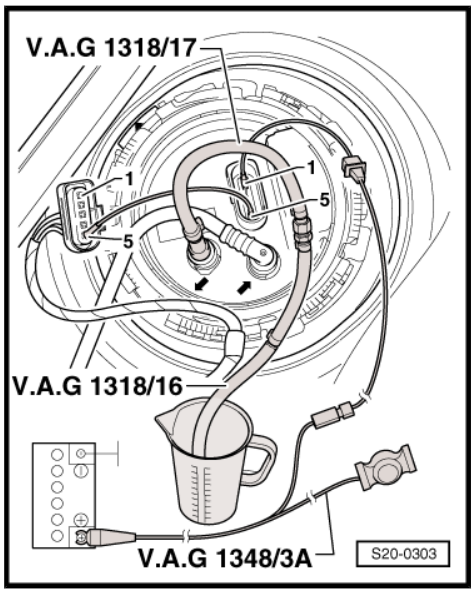
– Use the connection lines from the measuring tool set to connect the contacts -5- to the plug and to the fuel delivery unit.

– Pull off the fuel feed line from the flange of the fuel delivery unit. Unlock the quick coupling and disconnect ⇒ “2.10 Separating push-on couplings”, page 208 .

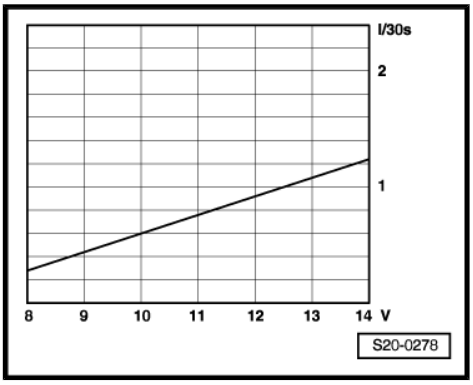
– Connect adapter - V.A.G 1318/17- and adapter - V.A.G 1318/16- , fit onto the feed support and hold the other end in a measuring glass.

– Activate the remote control - V.A.G 1348/3A- for 30 seconds.

– Measure the battery voltage.



– Compare the delivered fuel rate with the specified value:



Note

- *The amount of the fuel pumped is dependent on the voltage at the fuel pump.*
- *The diagram refers to the existing voltage at the fuel pump which is about 2 V less than the battery voltage.*

If the minimum fuel delivery volume is not reached:

– Remove the fuel delivery unit and check that the preliminary stage screen is not clogged up.

If no fault was detected:

– Replace fuel delivery unit:

- Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198
- Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200

3.4 Check voltage consumption of the fuel pump

Special tools and workshop equipment required

- Multimeter , e.g. -V.A.G 1526D-
- Amps clamp , e.g. -V.A.G 1526B/2-
- Test instrument adapter/DSO (5-pin) , e.g. -VAS 5565-

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Note

The battery voltage as well as the temperature of the diesel fuel have a major influence on the power consumption of the fuel pump. For this reason it is necessary to ensure that the battery voltage is at least 12 V when testing.

Test conditions

- Battery voltage at least 12 V
- Fuel temperature above 10 °C

Vehicles Octavia II and Superb II

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

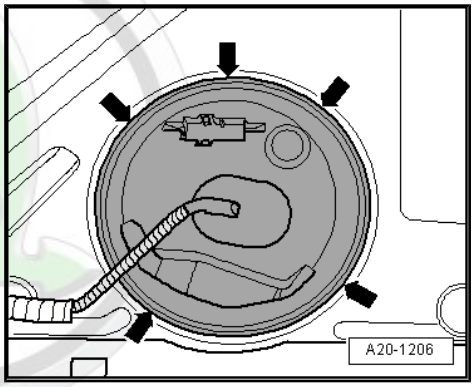
Yeti vehicles

– Remove rear seat bench with brackets ⇒ Body Work; Rep. gr. 72 .

– Remove floor covering under the rear seats.

Continued for all vehicles

– Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

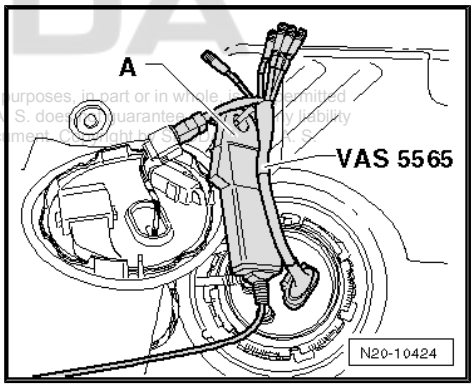
For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must be disconnected additionally.

– First of all check the plug for correct fit. Pull on the plug without pressing the locking mechanism. If the plug was not correctly plugged in, it may have caused a fault.

– Disconnect the plug from the flange of the fuel delivery unit.

– Connect the adapter for measuring method/DSO (5-pin) , e.g. -VAS 5565- , between the plug and the flange.

– Connect the current probe -A- on the red cable - with the inscription “current probe” - of the adapter for measuring method/DSO (5-pin) - VAS 5565- .



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Note

The current probe of the hand-held multimeter - V.A.G 1715- can also be used.

– Switch on the ignition.

– Connect vehicle diagnosis, measurement and information system - VAS- and carry out the function “test fuel pump”.

Note

The fuel pump is activated for 30 seconds.

– Read off power consumption at hand-held multimeter - V.A.G 1526D- .

• Set value: max. 7.5 A

If the power consumption is exceeded, the fuel pump is defective.

– Replace fuel delivery unit:

♦ Octavia II with front-wheel drive
⇒ “2.5 Removing and installing fuel delivery unit (Octavia II with front-wheel drive)”, page 198

♦ Superb II, Yeti and Octavia II with four-wheel drive
⇒ “2.6 Removing and installing fuel delivery unit (Superb II, Yeti, Octavia II with four-wheel drive)”, page 200

3.5 Check additional fuel pump - V393- or fuel pump 2 - V277-

Special tools and workshop equipment required

♦ Pressure gauge - VAS 6551-

♦ Connection piece - VAS 6551/5-1-

♦ Hose adapter - VAS 6551/5-2-

♦ Hose adapter - VAS 6551/2-

- Battery voltage at least 12 V
- Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- All electrical consumers such as the light and rear window heater must be switched off.

Note

- *Safety precautions when working on the fuel supply system* *⇒ “2.1 Safety precautions when working on fuel supply system”, page 4* .
- *Observe rules for cleanliness* *⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6* .

WARNING

Fuel feed line is pressurised. Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully releasing the connection point.

– Remove engine cover ⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Release clamp and pull the fuel feed line -arrow- off the high-pressure pump.

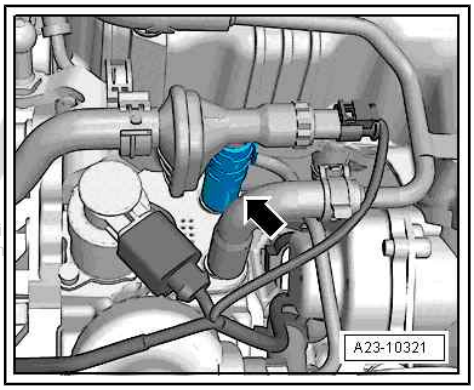
– Insert connection piece - VAS 6551/5-1- into fuel feed line and secure using a clamp.

– Connect the hose adapter - VAS 6551/2- between connection piece - VAS 6551/5-1- and connection “A” of the pressure gauge - VAS 6551- .

– Connect the hose adapter - VAS 6551/5-2- between high-pressure pump and connection “B” of the pressure gauge - VAS 6551- .

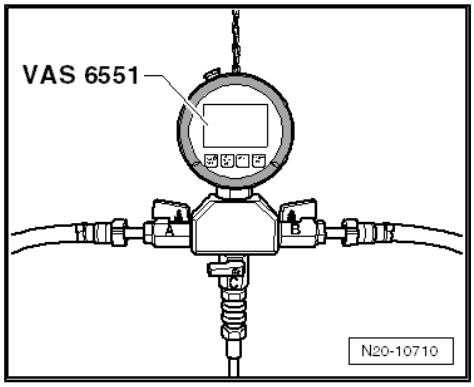
– Secure hose adapter - VAS 6551/5-2- to the high pressure pump using a clamp.

– Switch on the pressure gauge - VAS 6551- by pressing the button On/Off.



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– Open the shut-off cocks “A” and “B” of the pressure gauge and close the shut-off cock “C”.
– Connect vehicle diagnostic tester .
– Carry out the targeted function `test fuel pump`.



Note

The fuel pump will now be activated for 30 seconds.

- Specified value: at least 0,35 MPa (3,5 bar).

If the specified values are not reached:

– Check connection between pressure gauge and fuel line for leak tightness.
– Check the fuel flow rate of the fuel pump
⇒ “3.3 Check the fuel flow rate of the fuel pump”, page 222 .

Note

After installing, check the fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

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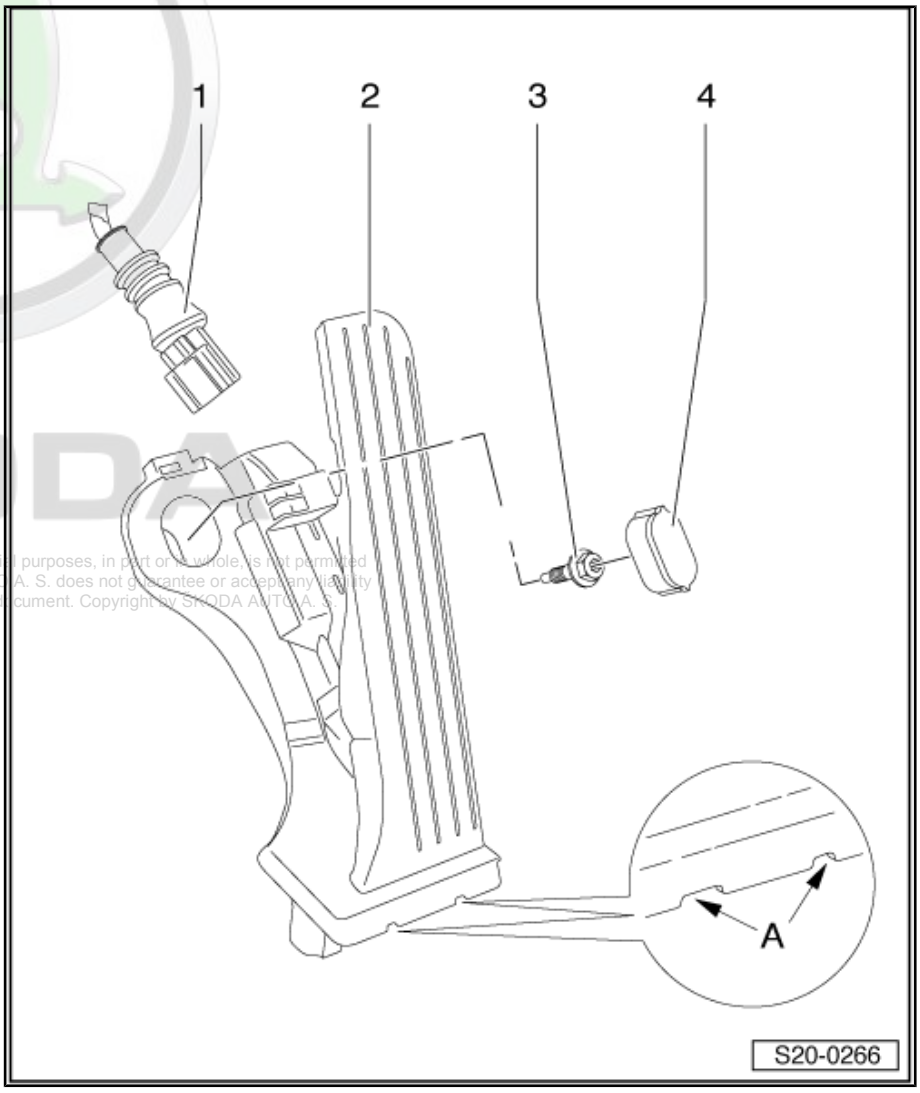
4 Accelerator control

⇒ “4.1 Assembly overview - accelerator module”, page 229

⇒ “4.2 Removing and installing accelerator pedal module”, page 229

⇒ “4.3 Disconnect connector for accelerator pedal module and fit on”, page 231

4.1 Assembly overview - accelerator module



1 - Connector

- ❑ disconnect and fit on ⇒ “4.3 Disconnect connector for accelerator pedal module and fit on”, page 231

2 - Accelerator pedal module

- ❑ with accelerator pedal position encoder - G79- and accelerator pedal position encoder 2 - G185-
- ❑ on vehicles with automatic gearbox with kick-down switch
- ❑ if the accelerator pedal module was replaced on vehicles with automatic gearbox, the engine control unit must be adapted ⇒ Vehicle diagnostic tester
- ❑ -A- openings for the release tool
- ❑ not adjustable
- ❑ Removing and installing ⇒ “4.2 Removing and installing accelerator pedal module”, page 229

3 - Screw

- ❑ 10 Nm

4 - Cap

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4.2 Removing and installing accelerator pedal module

Special tools and workshop equipment required

- ♦ Release tool - T10238- (for left-hand drive vehicle)
- ♦ Release tool - T10240- (for right-hand drive vehicle)

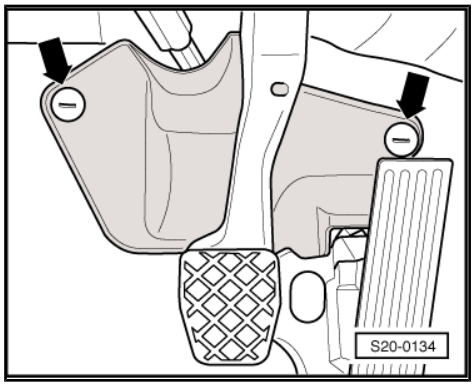
Removing

– Remove steering column trim panel -arrows-.

– Disconnect connector at accelerator pedal module
⇒ “4.3 Disconnect connector for accelerator pedal module and fit on”, page 231 .

– Lever out the cap (Pos. -4-) with a screwdriver
⇒ “4.1 Assembly overview - accelerator module”, page 229 .

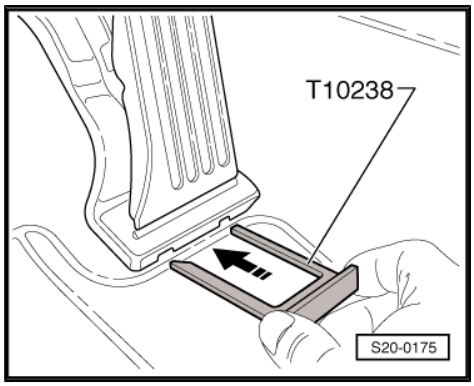
– Unscrew fixing screw -3-
⇒ “4.1 Assembly overview - accelerator module”, page 229 .



– Push the release tool - T10238- (for right-hand drive vehicles release tool - T10240-) as shown up to the stop into the provided openings.

– Disconnect connector at accelerator pedal module
⇒ “4.3 Disconnect connector for accelerator pedal module and fit on”, page 231 .

– Remove accelerator pedal module.



Installing

– Fit the plug -2- onto the accelerator pedal module -5-
⇒ “4.3 Disconnect connector for accelerator pedal module and fit on”, page 231 .

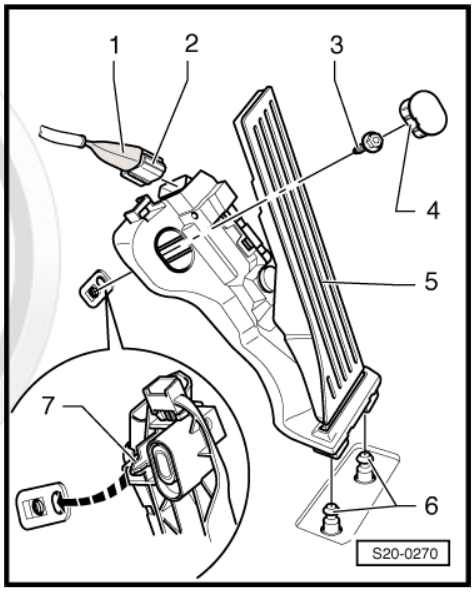
– Push again rubber grommet -1- onto the connector -2-.

– Push accelerator pedal module onto the securing bolt -6-.

– Insert the centering pin -7- into the hole in the underbody.

– Screw the accelerator pedal module with the fixing screw -3-, tighten to 10 Nm and fit on the cap -4-.

– Re-install steering column trim panel.



Note

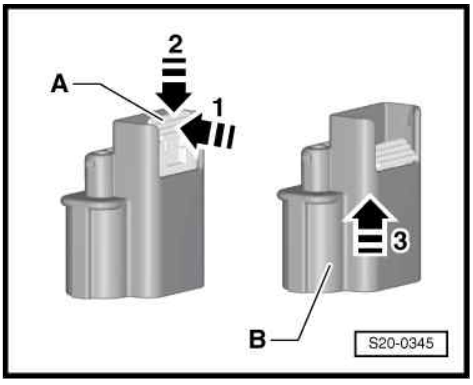
If the accelerator pedal module was replaced on vehicles with automatic gearbox, the engine control unit must be adapted ⇒ Vehicle diagnostic tester.

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4.3 Disconnect connector for accelerator pedal module and fit on

Note

The different connectors for the accelerator pedal module which are inserted, must be disconnected and fit on in a different manner.



Disconnect connector 1K0 973 706

– Lightly press the piston slide valve -A- (grey) in direction of arrow -1- and slide as far as it can go in the direction of arrow -2-.

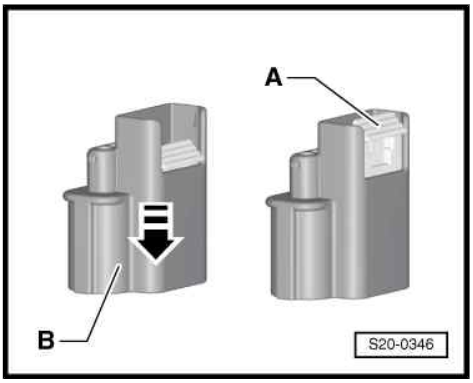
– Hold the piston slide valve in this position and disconnect the socket housing -B- in direction of arrow -3-

The piston slide valve -A- remains in the bottom position.

Fit on connector 1K0 973 706

– Push the socket housing -B- in -direction of arrow- until the piston slide valve can be heard to lock in place.

The piston slide valve -A- moves automatically upwards.



Note

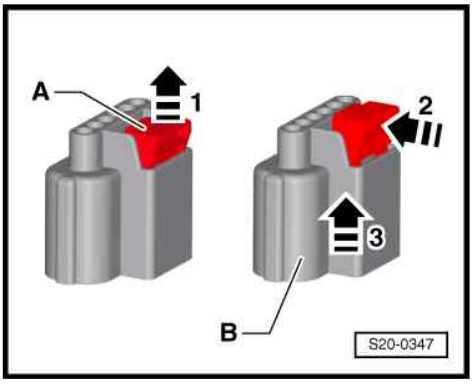
For safety reasons, check the connector for secure catch by tightening it in the opposite direction.

Disconnect connector 8K0 973 706

– Remove piston slide valve -A- (red) up to the stop in direction of arrow -1-.

– Press the piston slide valve in direction of arrow -2- and disconnect the socket housing -B- in direction of arrow -3-.

The piston slide valve -A- remains in the top position.

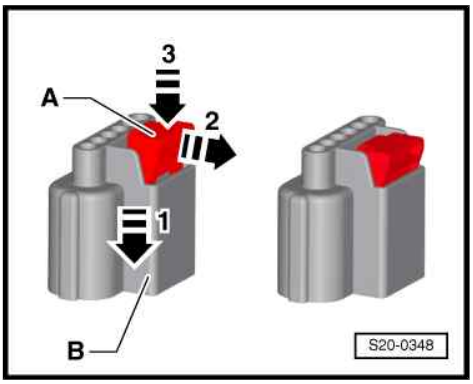


Fit on connector 8K0 973 706

– Push connector housing -B- in direction of arrow -1- as far as the stop.

– Lightly press the piston slide valve in direction of arrow -2- and slide in the direction of arrow -3-.

The piston slide valve -A- can only be pushed down if the socket housing was pushed up to the stop.



Note

For safety reasons, check the connector for secure catch by tightening it in the opposite direction.

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21 – Turbocharging/supercharging

1 Exhaust gas turbocharger

⇒ “1.1 Summary of components - exhaust gas turbocharger (for engines with identification characters CFFB, CFHA, CFHC, CFHF, CLCA, CLCB, CLJA)”, page 232

⇒ “1.2 Summary of components - exhaust gas turbocharger (for engines with identification characters CFGB, CFJA)”, page 235

⇒ “1.3 Removing and installing exhaust gas turbocharger”, page 238

⇒ “1.4 Removing and installing exhaust gas temperature sender 1 G235 (temperature sender upstream turbocharger G507)”, page 243

⇒ “1.5 Replacing the vacuum setting element for charge pressure control with position sender G581 ”, page 244

⇒ “1.6 Connection diagram for vacuum hoses (Octavia II)”, page 249

⇒ “1.7 Connection diagram for vacuum hoses (Superb II, Yeti)”, page 251

⇒ “1.8 Checking the vacuum system”, page 251

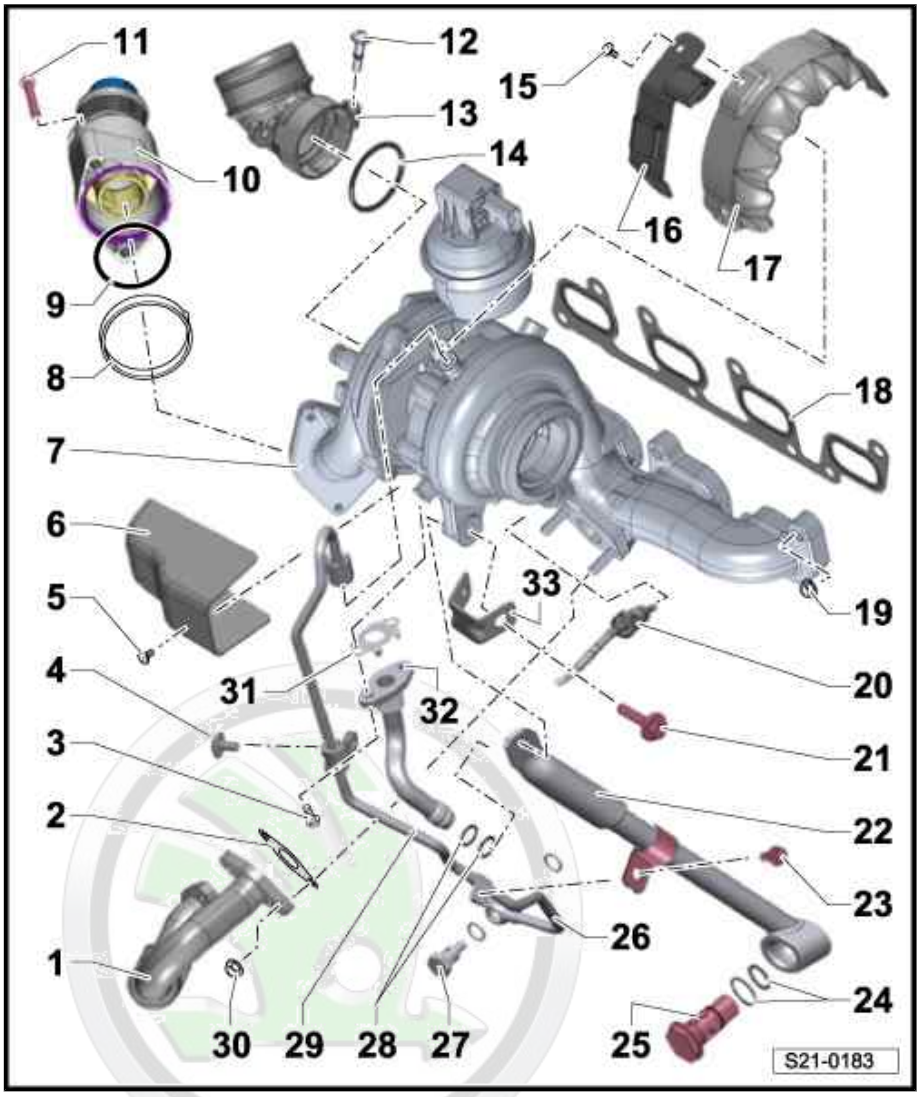
1.1 Summary of components - exhaust gas turbocharger (for engines with identification characters CFFB, CFHA, CFHC, CFHF, CLCA, CLCB, CLJA)

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Note

- *Observe rules for cleanliness*
  ⇒ “3.4 Regulations concerning cleanliness when working on the exhaust gas turbocharger”, page 7 .
- *Observe general instructions for charge-air system*
  ⇒ “3.5 General instructions for charge air system”, page 7 .

The exhaust turbocharger and the exhaust manifold are one component part.



1 - Connecting pipe
- ❑ to radiator for exhaust gas recirculation

2 - Seal
- ❑ Replace after disassembly

3 - Screw
- ❑ 20 Nm

4 - Screw
- ❑ to bracket Pos. -33-
- ❑ 10 Nm

5 - Screw
- ❑ 15 Nm

6 - Heat shield

7 - Exhaust gas turbocharger
- ❑ only complete with exhaust manifold
- ❑ Removing and installing ⇒ “1.3 Removing and installing exhaust gas turbocharger”, page 238
- ❑ Remove and install the connection pipe for the intake hose ⇒ “3.6 Removing and installing air filter”, page 309
- ❑ Replace the vacuum setting element for charge pressure control with position sender - G581- ⇒ “1.5 Replacing the vacuum setting element for charge pressure control with position sender G581 ”, page 244

8 - Retaining loop
- ❑ can only be installed in one position

9 - O-ring
- ❑ Replace after disassembly

10 - Pulsation dampener

11 - Screw
- ❑ 9 Nm

12 - Screw
- ❑ cannot be separated from the inlet connection Pos. -13-
- ❑ 9 Nm

13 - Inlet connection
- ❑ with fixing screw Pos. -12-

14 - O-ring
- ❑ Replace after disassembly

15 - Screw
- ❑ 15 Nm

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16 - Mounting bracket

- ❑ for electrical cables

17 - Heat shield

18 - Seal

- ❑ Replace after disassembly

19 - Nut

- ❑ Replace after disassembly
- ❑ 25 Nm

20 - Exhaust gas temperature sender 1 - G235- (Temperature sender upstream of turbocharger - G507-)

- ❑ the thread of a new sender must be coated with assembly paste
- ❑ coat thread with hot bolt paste - G 052 112 A3- before installing a used sender
- ❑ Removing and installing
  ⇒ “1.4 Removing and installing exhaust gas temperature sender 1 G235 (temperature sender upstream turbocharger G507)”, page 243
- ❑ 45 Nm

21 - Screw

- ❑ 20 Nm

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22 - Support for exhaust gas turbocharger

- ❑ for oil return-flow line

23 - Screw

- ❑ 10 Nm

24 - Compression rings

- ❑ different diameters, observe fitting position
- ❑ Replace after disassembly

25 - hollow bolt

- ❑ Replace after disassembly
- ❑ For vehicles with four-wheel drive, the flange shaft to the right of the angle gearbox must be removed for removal and installation ⇒ Gearbox; Rep. gr. 39 ; Differential; Removing and installing right flange shaft
- ❑ 40 Nm

26 - Compression rings

- ❑ Replace after disassembly

27 - hollow bolt

- ❑ 30 Nm

28 - O-ring

- ❑ Replace after disassembly

29 - Oil feed line

- ❑ when removing the connection fitting, counterhold the exhaust gas turbocharger using the wrench -T10461-
- ❑ check continuity
- ❑ before installing, fill the exhaust gas turbocharger on the connection fitting with engine oil
- ❑ Tighten union nut with socket -T40055-
- ❑ 22 Nm

30 - Nut

- ❑ Replace after disassembly
- ❑ 24 Nm

31 - Seal

- ❑ Replace after disassembly

32 - Oil return pipe

Caution

Before installing, check whether the bellows of the oil return pipe is not bent or overstretched. If this is the case, micro-cracks might occur which can result in leaks. Replace damaged oil return pipe or support for exhaust gas turbocharger.

33 - Mounting bracket

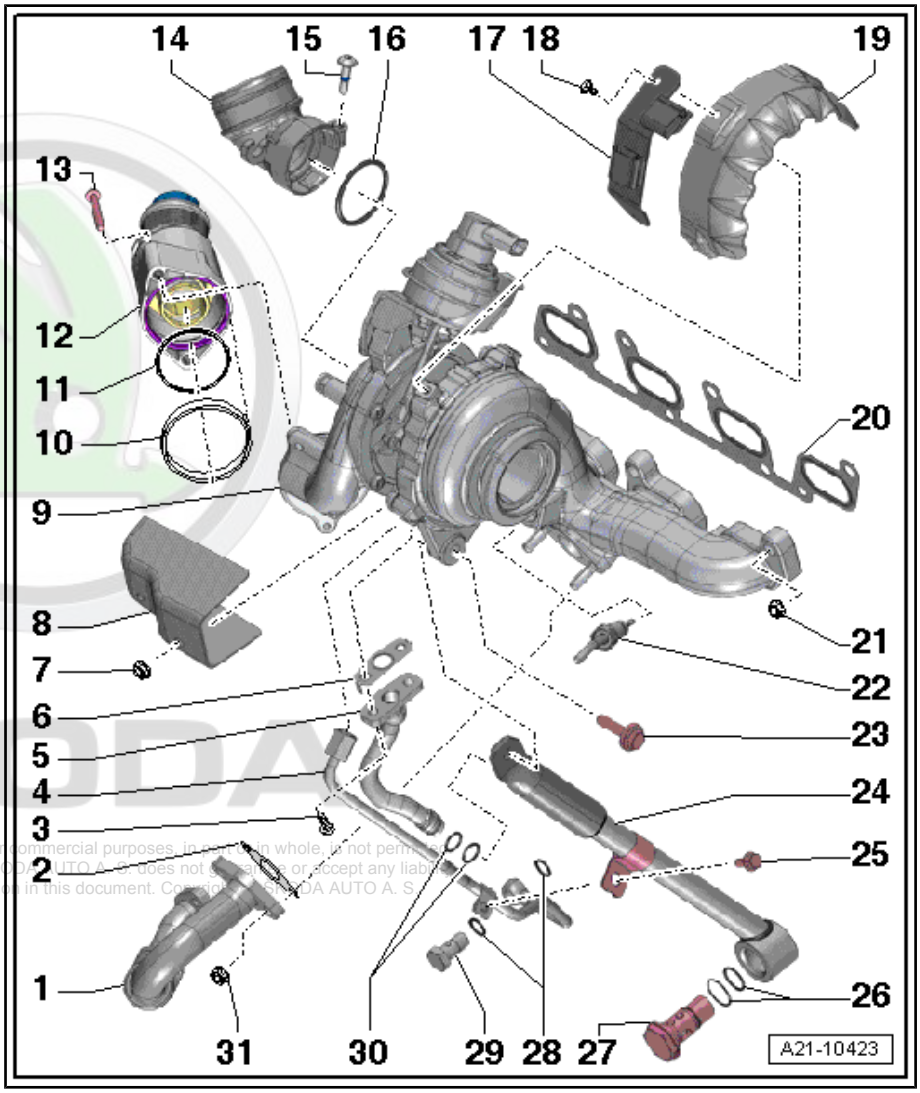
- ❑ for oil feed line

1.2 Summary of components - exhaust gas turbocharger (for engines with identification characters CFGB, CFJA)

Note

- *Observe rules for cleanliness*
  ⇒ *"3.4 Regulations concerning cleanliness when working on the exhaust gas turbocharger", page 7* .
- *Observe general instructions for charge-air system*
  ⇒ *"3.5 General instructions for charge air system", page 7* .

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1 - Connecting pipe

- ❑ to radiator for exhaust gas recirculation
- ❑ with decoupling element; do not bend the decoupling element - Risk of crack formation

2 - Seal

- ❑ Replace after disassembly

3 - Screw

- ❑ Replace after disassembly
- ❑ 17 Nm

4 - Oil feed line

- ❑ when removing the connection fitting, counterhold the exhaust gas turbocharger using the wrench - T10461-
- ❑ check continuity
- ❑ before installing, fill the exhaust gas turbocharger on the connection fitting with engine oil
- ❑ Tighten the union nut with socket - T40055-
- ❑ 22 Nm

5 - Oil return pipe

> **Caution**
>
> ***Before installing, check whether the bellows of the oil return pipe is not bent or overstretched. If this is the case, microcracks might occur which can result in leaks. Replace damaged oil return pipe or support for exhaust gas turbocharger.***

6 - Seal

- ❑ Replace after disassembly

7 - Nut

- ❑ 24 Nm

8 - Heat shield

9 - Exhaust gas turbocharger

- ❑ can only be replaced complete with exhaust manifold and vacuum setting element
- ❑ Removing and installing ⇒ “1.3 Removing and installing exhaust gas turbocharger”, page 238

10 - Retaining loop

- ❑ can only be installed in one position

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11 - O-ring
- ❑ Replace after disassembly

12 - Pulsation dampener

13 - Screw
- ❑ 9 Nm

14 - Inlet connection
- ❑ with fixing screw Pos. -15-

15 - Screw
- ❑ cannot be separated from the inlet connection Pos. -14-
- ❑ 9 Nm

16 - O-ring
- ❑ Replace after disassembly

17 - Mounting bracket
- ❑ for electrical cables

18 - Screw
- ❑ 15 Nm

19 - Heat shield

20 - Seal
- ❑ Replace after disassembly

21 - Nut
- ❑ Replace after disassembly
- ❑ 24 Nm

22 - Exhaust gas temperature sender 1 - G235- (Temperature sender upstream of turbocharger - G507-)
- ❑ the thread of a new sender must be coated with assembly paste
- ❑ coat thread with hot bolt paste - G 052 112 A3- before installing a used sender
- ❑ Removing and installing
⇒ “1.4 Removing and installing exhaust gas temperature sender 1 G235 (temperature sender upstream turbocharger G507)”, page 243
- ❑ 45 Nm

23 - Screw
- ❑ 20 Nm

24 - Support for exhaust gas turbocharger
- ❑ for oil return-flow line

25 - Screw
- ❑ 10 Nm

26 - Compression rings
- ❑ different diameters, observe fitting position
- ❑ Replace after disassembly

27 - hollow bolt
- ❑ Replace after disassembly
- ❑ For vehicles with four-wheel drive, the flange shaft to the right of the angle gearbox must be removed for removal and installation ⇒ Gearbox; Rep. gr. 39 ; Differential; Removing and installing right flange shaft
- ❑ 40 Nm

28 - Compression rings
- ❑ Replace after disassembly

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29 - hollow bolt

- ❑ 30 Nm

30 - O-ring

- ❑ Replace after disassembly

31 - Nut

- ❑ Replace after disassembly
- ❑ 24 Nm

1.3 Removing and installing exhaust gas turbocharger

Special tools and workshop equipment required

- ♦ Key - T40055-
- ♦ Key - T10461-
- ♦ Pliers for spring-type clips

Removing

Caution

In case of mechanical damage to the exhaust gas turbocharger, e.g. damage of the compressor wheel, it is not sufficient to only replace the exhaust gas turbocharger. In order to prevent consequential damage to the engine, perform the following tasks:

- ♦ *Clean all oil lines.*
- ♦ *Change engine oil and oil filter.*
- ♦ *Check air filter, air filter insert and charge air hoses as well as charge air pipes for soiling.*
- ♦ *Check all the air guides and the charge air cooler for foreign bodies.*

If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.

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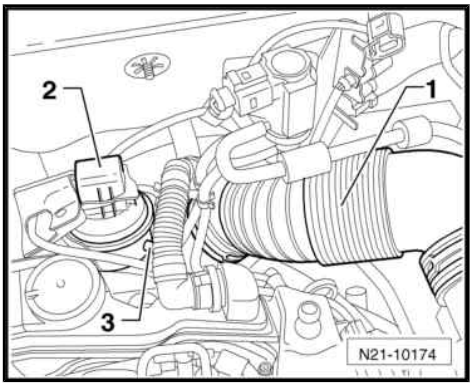
Note

- ♦ *Observe rules for cleanliness*
  ⇒ “3.4 Regulations concerning cleanliness when working on the exhaust gas turbocharger”, page 7 .
- ♦ *Observe general instructions for charge-air system*
  ⇒ “3.5 General instructions for charge air system”, page 7 .

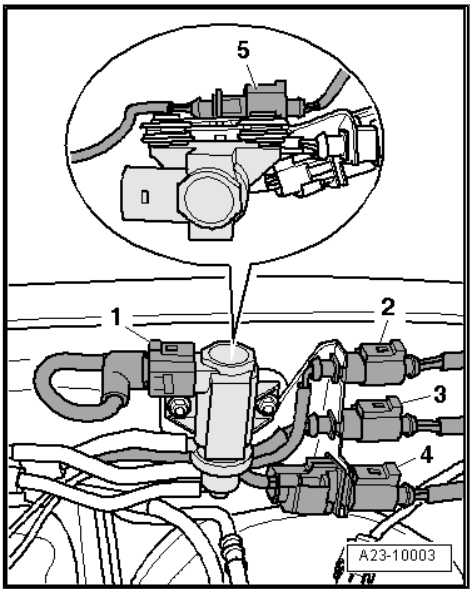
– Remove pre-exhaust pipe:

- ♦ Engine identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA
  ⇒ “1.5 Removing and installing pre-exhaust pipe with particle filter”, page 327 .
- ♦ Engine identification characters CLCA, CLCB, CLJA
  ⇒ “1.6 Removing and installing pre-exhaust pipe with catalytic converter”, page 331 .

– Remove air filter with air mass meter - G70- and inlet hose ⇒ “3.6 Removing and installing air filter”, page 309 .
– Remove intake manifold -1- and disconnect plug -2- from position sender for charge pressure regulator - G581- at exhaust gas turbocharger.
– Detach vacuum line -3- at exhaust gas turbocharger.



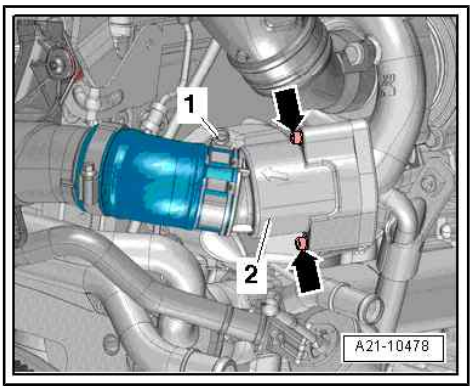
– Disconnect plug connection -3- for exhaust gas temperature sender 1 - G235- (temperature sender upstream turbocharger - G507-) and expose electrical cable.



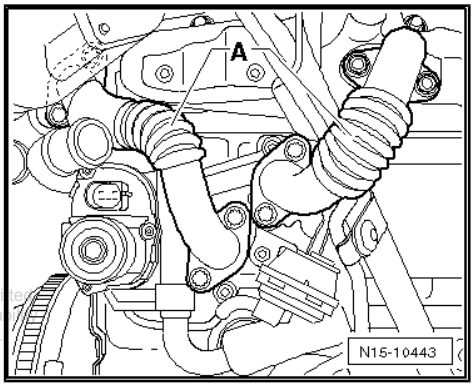
– Remove screws -arrows-.
– Slacken hose clamp -1- and remove pulsation dampener -2-.

Caution

Pay attention that the bellows of the connection pipe is not bent and therefore is not overstretched. There is a risk of crack formation.

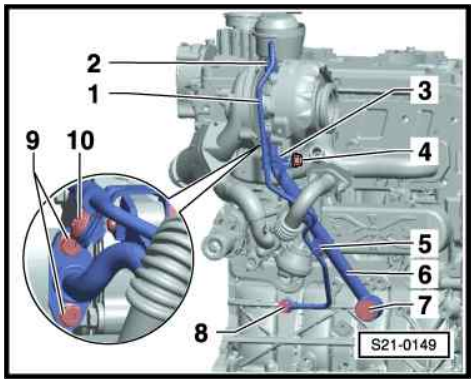


– Remove connection pipes for exhaust gas recirculation -A-.



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Vehicles with front-wheel drive



- Unscrew the union nut -2- of the oil feed line -1-. At the same time counterhold the hexagon of the connection fitting using the key - T10461- .
- Unscrew screws -4- and -9-.
- Release hollow screws -7- and -8-.
- Remove the support for exhaust gas turbocharger -6- with oil return pipe and oil feed pipe -1-.

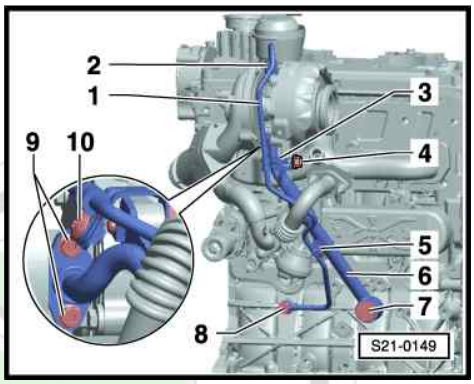
Vehicles with four-wheel drive

- Remove flange shaft to right of angle gearbox ⇒ Gearbox; Rep. gr. 39 ; Differential; Removing and installing right flange shaft .

Note

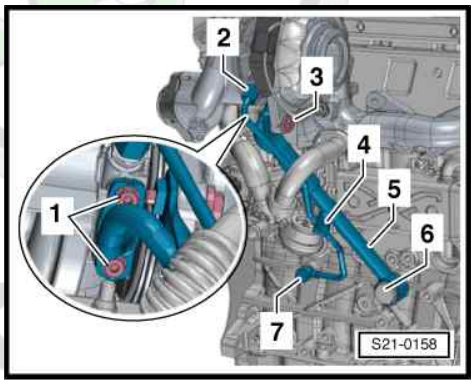
The oil feed line remains attached on the cylinder block. Otherwise the angle gearbox must be removed.

Vehicles with four-wheel drive and engine codes CFFB, CFHC, CFHF, CLCB



- Unscrew screws -5- and -10-.
- Unscrew the union nut -2- of the oil feed line -1-. At the same time counterhold the hexagon of the connection fitting using the key - T10461- .
- Bend oil feed line -1- of turbocharger (do not slacken hollow screw -8-).
- Unscrew screws -4- and -9-.
- Release hollow screw -7-.
- Remove support for exhaust gas turbocharger -6- with oil return pipe.

Four-wheel drive vehicles with engine codes CFGB, CFJA

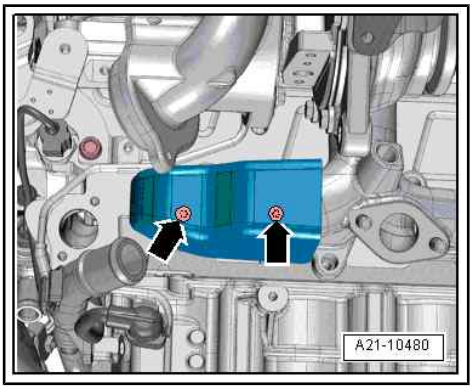


- Unscrew screw -4- for clamping the oil feed line.
- Unscrew union nut -2-. At the same time counterhold the hexagon of the connection fitting using the wrench - T10461- .
- Bend oil feed line of turbocharger (do not slacken hollow screw -7-).
- Release screws -1- and -3- and hollow screw -6-.
- Remove support for exhaust gas turbocharger -5- with oil return pipe.

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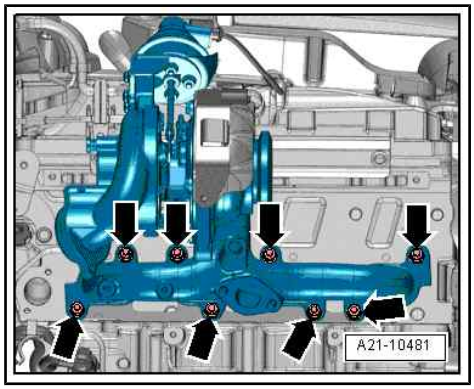
– Release screws -arrows- and remove heat shield.



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– Unscrew the fixing nuts of the exhaust manifold -arrows-.

– Remove exhaust turbocharger with exhaust manifold downwards.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Caution

Before installing, check whether the bellows of the oil return pipe is not bent or overstretched. If this is the case, microcracks might occur which can result in leaks. Replace damaged oil return pipe or support for exhaust gas turbocharger.

Note

- *Replace the gaskets, the sealing rings and the self-locking nuts.*
- *Fill exhaust turbocharger with engine oil through the connection fitting of the oil feed line.*
- *Remove oil and grease from the charge air pipes and hoses and from their connections before installing.*
- *Secure all hose connections with screw clamps.*
- *Only install approved clamps for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *When installing, the heat protection sleeves must be refitted into the original positions.*

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– Checking the oil level:

- ⇒ Maintenance ; Booklet Octavia II
- ⇒ Maintenance ; Booklet Superb II
- ⇒ Maintenance ; Booklet Yeti

– Perform basic setting of the exhaust turbocharger⇒ Vehicle diagnostic tester.

Note

After installing the exhaust turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger bearing.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Exhaust gas turbocharger (for engines with codes CFFB, CFHA, CFHC, CFHF, CLCA, CLCB, CLJA)
  ⇒ “1.1 Summary of components - exhaust gas turbocharger (for engines with identification characters CFFB, CFHA, CFHC, CFHF, CLCA, CLCB, CLJA)”, page 232 .

- Exhaust gas turbocharger (for engines with codes CFGB, CFJA)
  ⇒ “1.2 Summary of components - exhaust gas turbocharger (for engines with identification characters CFGB, CFJA)”, page 235 .

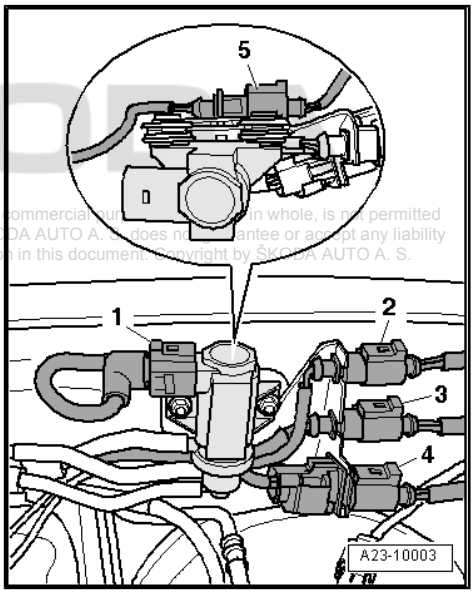
1.4 Removing and installing exhaust gas temperature sender 1 - G235- (temperature sender upstream turbocharger - G507-)

Special tools and workshop equipment required

- Set of tools - T10395-

Removing

– Disconnect plug connection -3- for exhaust gas temperature sender 1 - G235- (temperature sender upstream turbocharger - G507-) and expose electrical cable.



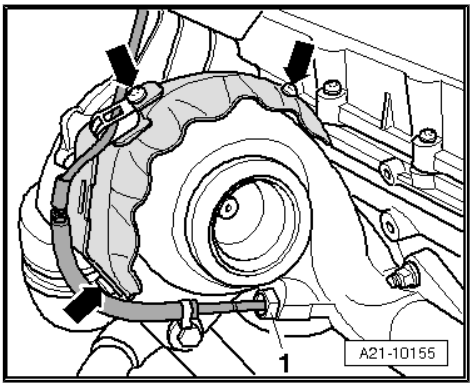
Vehicles with four-wheel drive

– Remove propshaft ⇒ Gearbox; Rep. gr. 39 .

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Continued for all vehicles

– Unscrew exhaust gas temperature sender 1 - G235- (temperature sender upstream turbocharger - G507-) -1- from the exhaust manifold using the socket insert SW 17 from the set of tools - T10395- .



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *The thread of the new temperature sender must be coated with assembly paste.*
- *Before installing, grease only the thread with hot bolt paste - G 052 112 A3- for a re-used temperature sender.*
- *All cable straps should be fastened again in the same place when installing.*

Tightening torques - summaries of components

- Exhaust gas temperature sender 1 - G235-
  ⇒ “1.3 Summary of components - exhaust temperature regulation”, page 324 .

1.5 Replacing the vacuum setting element for charge pressure control with position sender - G581-

Engines with identification characters CFFB, CFHA, CFHC, CFHF, CLCA, CLCB, CLJA

Note

The socket insert - T10422 A- replaces the previous socket insert - T10422- . Already exisiting socket inserts without index »»A«« can still be used.

Special tools and workshop equipment required

- Socket insert - T10422- or socket insert - T10422 A-
- Ring spanner 10 × 12 - T10423-
- Key - T10461-
- Thin paint brush (approx. 20 cm long)
- Hand vacuum pump - VAS 6213-

WARNING

The special tools, in particular the socket insert - T10422- or the socket insert - T10422 A- , are only designed for the use as shown in the following work procedure and must not be used for other screwed connections. There is the risk of deformations and slipping of the socket insert at higher tightening torques.

Note

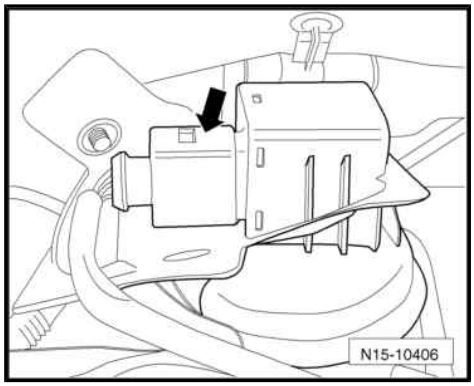
In order to replace the vacuum setting element for the charge pressure control with the position sender - G581- the spare part set is used ⇒ ETKA - Electronic Catalogue of Original Parts .

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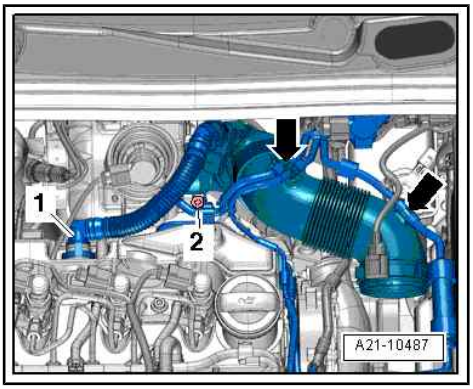
Removing

– Remove cover and bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .

– Open the heat-protection matting and disconnect the plug -arrow- on the position sender for charge pressure regulator - G581- .



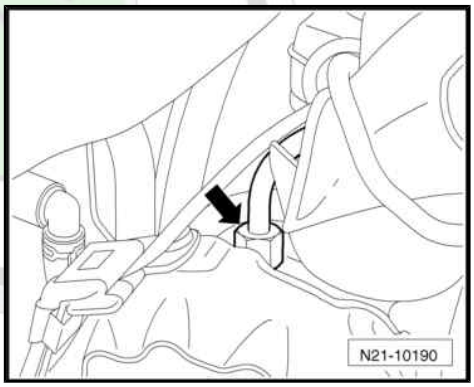
– Remove the connecting pipe -1- for the crankcase ventilation from the cylinder head cover, to do so press together the release buttons.
– Unclip vacuum hoses -arrows-.
– Release screw -2- (captive), swivel intake hose with connection fitting towards the rear and detach from exhaust gas turbocharger.
– Close the inlet opening on the exhaust gas turbocharger with a screw cap from the spare part set.
– Detach vacuum line from vacuum setting element for exhaust gas turbocharger.



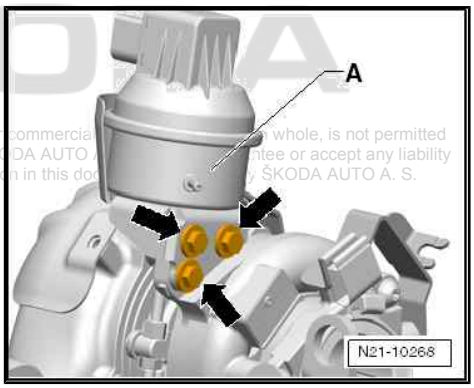
Caution

When slackening the union nut of the oil feed line, it is absolutely essential to counterhold the connection fitting on the exhaust gas turbocharger with the wrench - T10461- .

– Unscrew the union nut of the oil feed line -arrow-, to do so counterhold the connection fitting on the exhaust gas turbocharger with the wrench - T10461- .
– Close the opening of the connection fitting on the exhaust gas turbocharger with a plug from the spare part set.

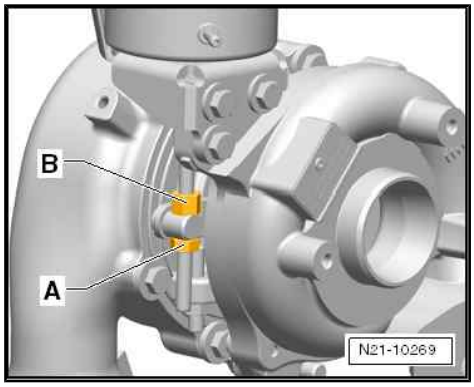


– Unscrew the fixing screws -arrows- and divert the vacuum setting element -A-.



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– Counterhold the counternut -B- with ring spanner - T10423- and unscrew the adjusting nut -A- from the control rod with socket insert - T10422- or socket insert - T10422 A- .
– Remove the vacuum setting element for charge pressure control with the position sender - G581- from the exhaust gas turbocharger.



Installing

Caution

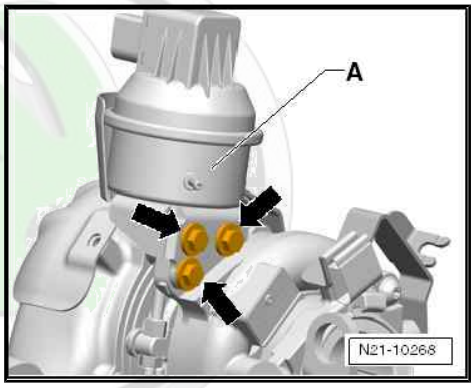
Only use new screws and nuts from the spare part set!

– If necessary, remove the bottom adjusting nut from the control rod of the new vacuum setting element.
– Screw the counternut onto the control rod of the new vacuum setting element by hand up to the thread end and pull the control rod through the opening in the cylinder of the adjusting lever on the exhaust gas turbocharger.

Note

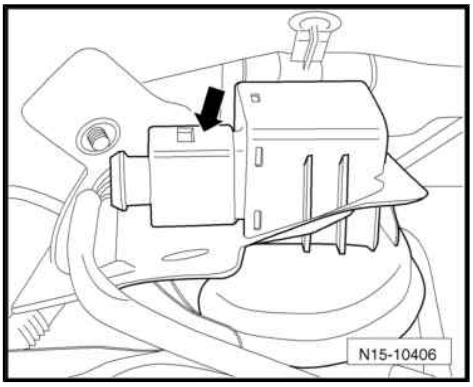
Ensure that the operating lever moves smoothly on the control rod.

– Move the vacuum setting element -A- in its installed position and screw in fixing screws -arrows-.
– Tighten screws -arrows- to 8 Nm.



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– Fit the plug -arrow- on the position sender for charge pressure regulator - G581- and close the heat-protection matting.



Adjust the vacuum setting element for exhaust turbocharger

– Connect vehicle diagnosis, measurement and information system VAS and switch on the ignition.

Select operating mode

– Press the button `vehicle self-diagnosis` on the screen.

Select vehicle system

– Press the button `01 - Engine Electronics` on the screen.

The control unit identification and the coding of the engine control unit are indicated on the display.

Select diagnosis function

– Press the button `011 - Measured values` on the screen.

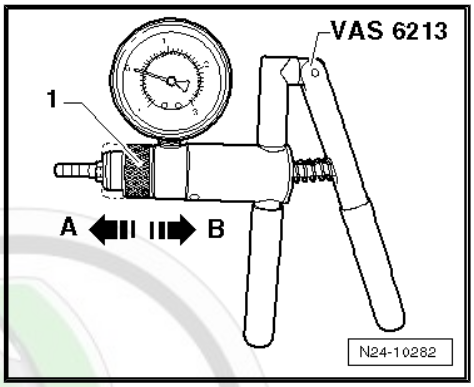
– Select the “"Actuator for turbocharger, high pressure, actual value, raw voltage"” in the selection list and move forward until the measured value is shown on the screen.

Note

In order to generate “vacuum”, push the ring -1- for the hand vacuum pump - VAS 6213- into position -A-.

– Connect the hand vacuum pump - VAS 6213- to the connection of the vacuum setting element.

– Observe the lowest values of the measured value block and set the voltage to 0.760 V by building up vacuum.

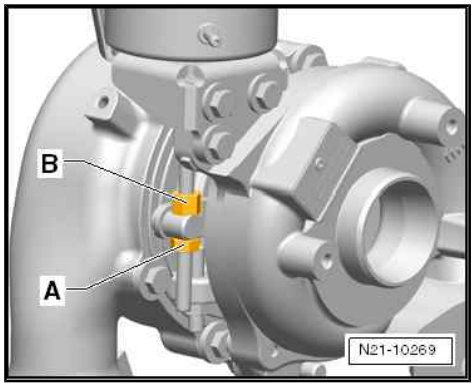


Caution

During the following setting of the control rod, maintain a steady vacuum and thus also a constant voltage of 0.760 V.

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– Leave the operating lever in the position »bottom limit« and slowly continue to screw the counternut -B- on the control rod up to the cylinder by hand.
– Hold the counternut -B-, screw the adjusting nut -A- on the control rod opposite the cylinder on the adjusting lever and slightly tighten with the ring spanner - T10423- .
– Reduce the vacuum in the pressure box of the vacuum setting element.
– Observe the lowest values of the measured value block:
• If devacuumized, a value of 3.00 … 3.40 V must be set.
– Tighten the adjusting nut -A- with the socket insert - T10422- or the socket insert - T10422 A- ; to do so hold the counternut -B- with the ring spanner - T10423- .

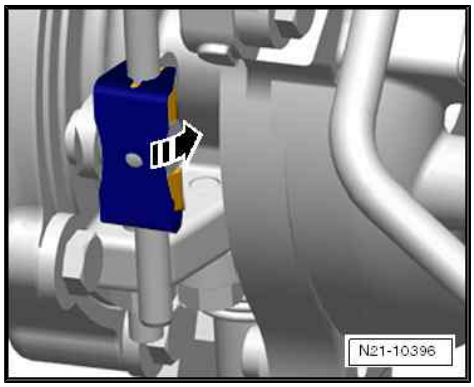


Caution

Generate a vacuum of 0.65 ± 0.05 bar at the vacuum setting element to ensure that the adjusting lever is positioned on the »limit stop«. While doing so, a voltage of 0.760 V must be set.

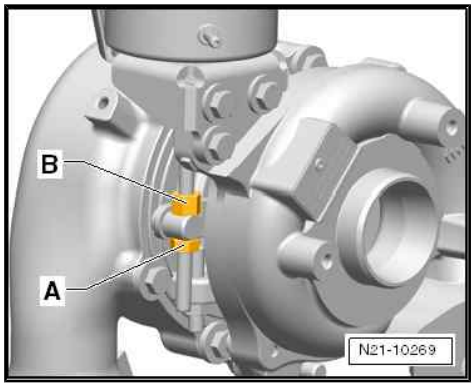
If the voltage value is o.k.

– Press the lock washer on the control rod by hand and turn it 90° in -direction of arrow-.
– Apply paint with a thin paint brush from the spare part set to seal the connection of the control rod/adjusting nut.



If the voltage value is not o.k.

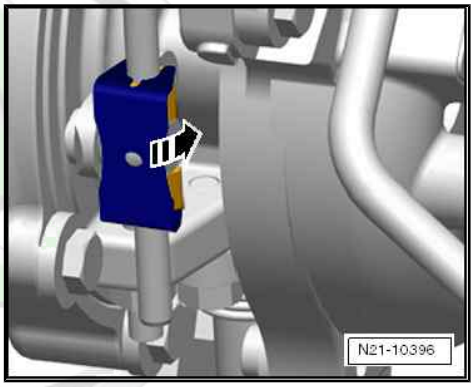
– Hold the counternut -B-, slacken the adjusting nut -A- and correct the voltage value by turning the counternut -B-.
– Hold the counternut -B- and tighten the adjusting nut -A- with the socket insert - T10422- .



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– Press the lock washer on the control rod by hand and turn it 90° in -direction of arrow-.

– Apply paint with a thin paint brush from the spare part set to seal the connection of the control rod/adjusting nut.



Finish the installation and check the adjustment

Further installation occurs in reverse order for removal, while paying attention to the following:

– Remove the plug from the connection fitting on the exhaust gas turbocharger, install the oil feed line and tighten the union nut using the socket wrench insert - T40055- .

Tightening torque 22 Nm.

– Remove the screw cap from the inlet opening of the exhaust gas turbocharger and complete the engine.

– Start engine and erase event memory ⇒ Vehicle diagnostic tester.

– Check the setting as follows:

Select diagnosis function

– Press the button “005 - Self-diagnosis” on the screen.

– Select “exhaust gas turbocharger 1” in the selection list.

– Press the button “Measured values” on the bottom right of the screen.

– Select “Actuator for turbocharger, high pressure, actual value, raw voltage” in the selection list.

– Press the button “Start” on the bottom right of the screen.

Now the control rod of the vacuum setting element adjusts the operating lever of the exhaust gas turbocharger alternatively to both end positions.

– Observe the values of the position sender for charge pressure regulator - G581- in the bottom window of the screen:

• The voltage must oscillate between 0.650 … 0.850 V and 3.000 … 3.400 V.

The control rod is driven alternatively to both end stops.

If the voltage values are o.k.:

– End the diagnosis.

If the voltage values are not o.k.:

– Correct the setting ⇒ page 248 .

1.6 Connection diagram for vacuum hoses (Octavia II)

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1 - Vacuum setting element

- ❑ for change-over flap of radiator for exhaust gas recirculation

2 - Non-return valve

- ❑ Check fitting position
- ❑ light side pointing towards the vacuum pump -Pos. 7-

3 - Changeover valve for radiator of exhaust gas recirculation - N345-

- ❑ Check change-over ⇒ “2.4 Checking change-over flap for radiator for exhaust gas recirculation”, page 351

4 - Cylinder head cover

- ❑ with integrated vacuum reservoir

5 - Vacuum setting element

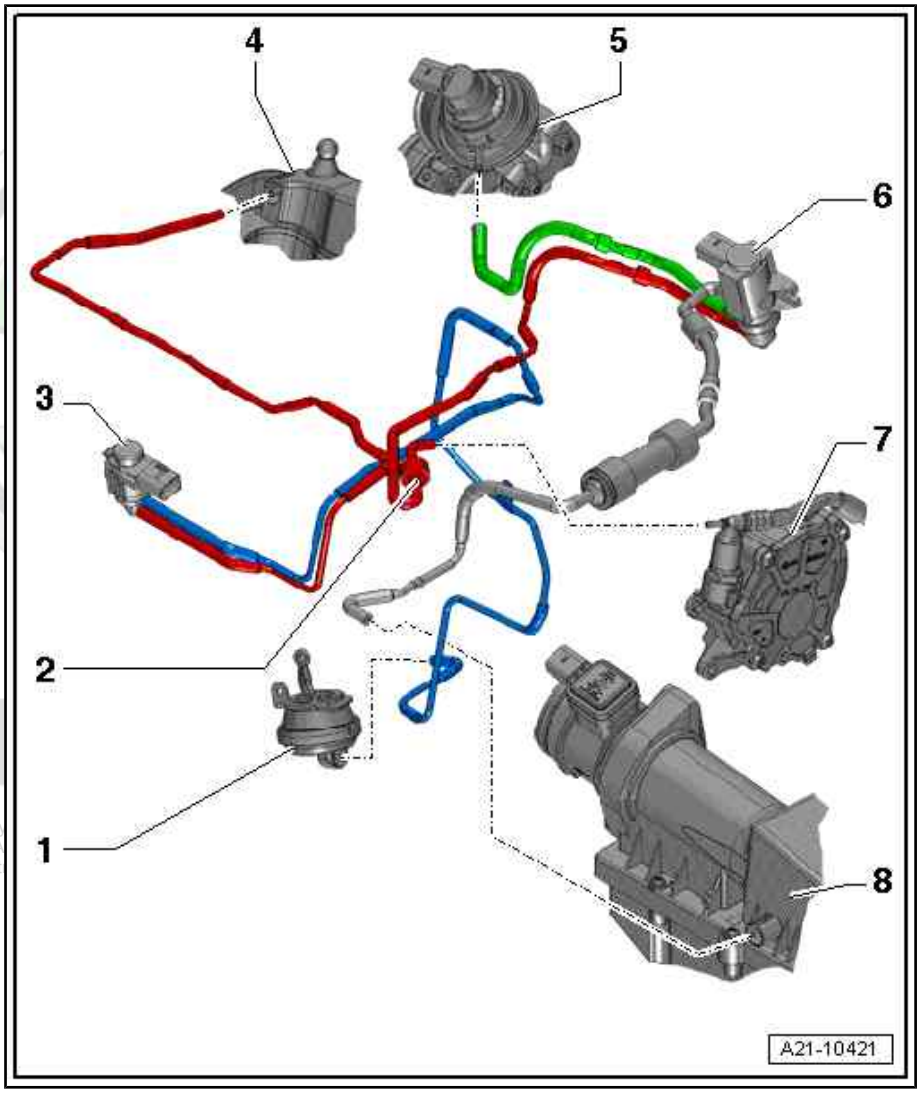
- ❑ at exhaust gas turbocharger
- ❑ for position transmitter for charge pressure regulator - G581-

6 - Solenoid valve for charge pressure control - N75-

7 - Vacuum pump

8 - Air filter

- ❑ with connecting piece for vent line



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1.7 Connection diagram for vacuum hoses (Superb II, Yeti)

1 - Vacuum setting element
- ❑ at exhaust gas turbocharger
- ❑ for position transmitter for charge pressure regulator - G581-

2 - Solenoid valve for charge pressure control - N75-

3 - Silencer

4 - Air filter

5 - To the brake servo unit

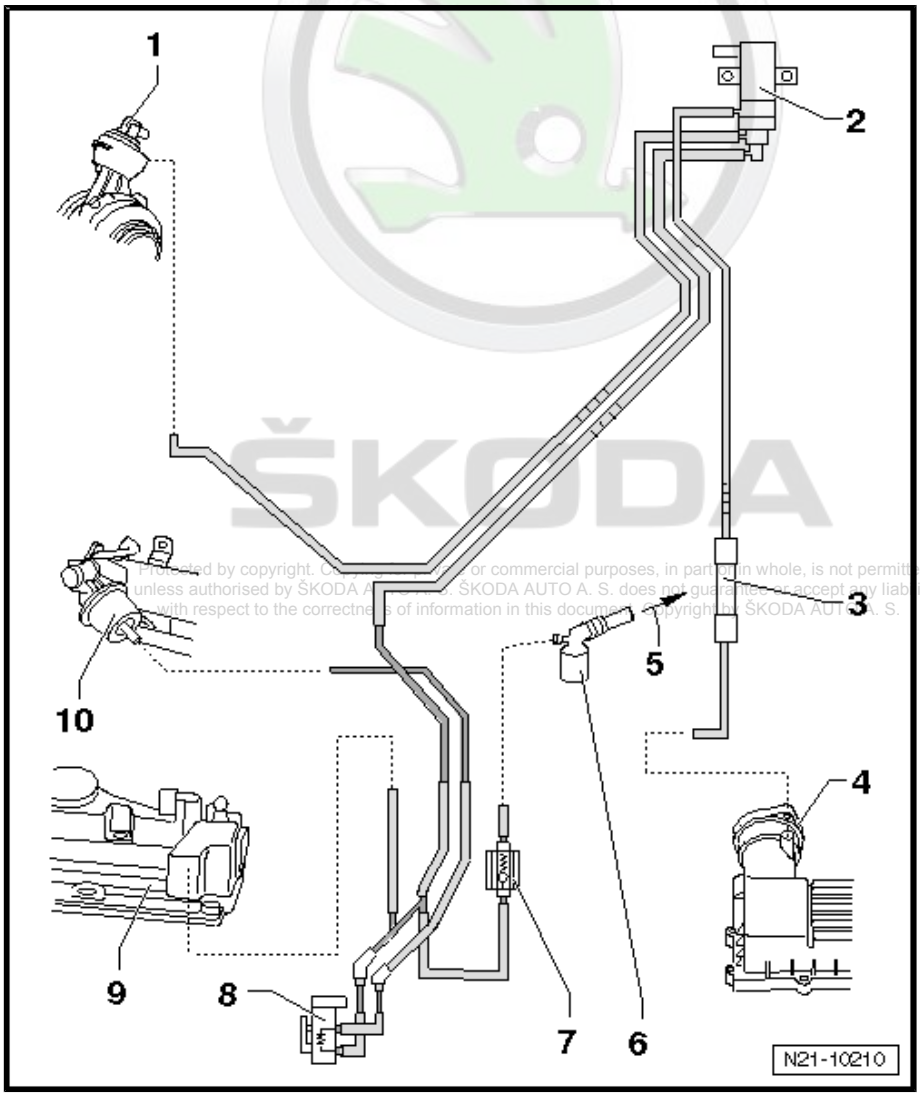
6 - Connection piece
- ❑ at the vacuum pump

7 - Non-return valve
- ❑ Check fitting position
- ❑ light side pointing towards the connection piece -Pos. 6-

8 - Changeover valve for radiator of exhaust gas recirculation - N345-
- ❑ Check change-over ⇒ “2.4 Checking change-over flap for radiator for exhaust gas recirculation”, page 351

9 - Cylinder head cover
- ❑ with integrated vacuum reservoir

10 - Vacuum setting element
- ❑ for change-over flap of radiator for exhaust gas recirculation



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1.8 Checking the vacuum system

Caution

When routing the vacuum lines, make sure that the lines are not kinked, twisted or crimped. Otherwise this can lead to breakdown.

Special tools and workshop equipment required

♦ Hand vacuum pump , e.g. -VAS 6213-

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

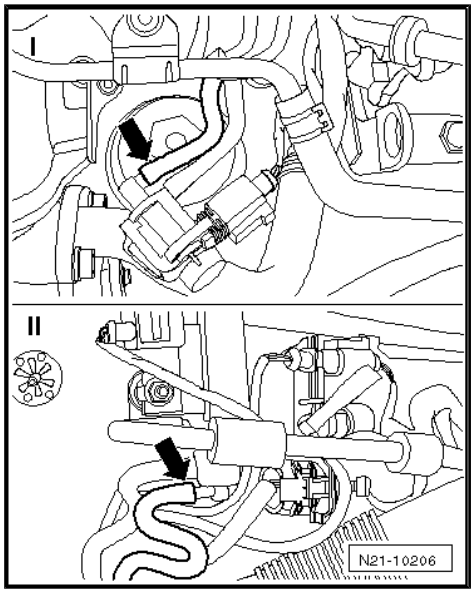
Check vacuum supply line, vacuum reservoir and non-return valve

– Unclip the changeover valve for radiator of exhaust gas recirculation - N345- from the front bracket at the intake manifold.

– Detach the vacuum hose on the bottom connection of the exhaust gas recirculation radiator change-over valve - N345- -arrow- in -I-.

– Detach the vacuum hose from the bottom connection of the charge pressure control solenoid valve - N75- -arrow- in -II-.

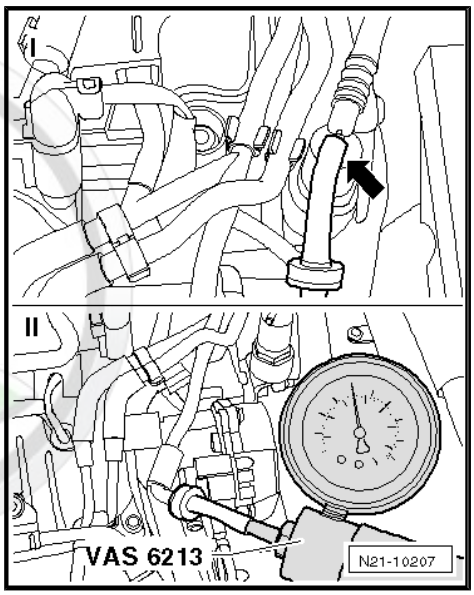
– Close off the open hose ends with suitable plugs.



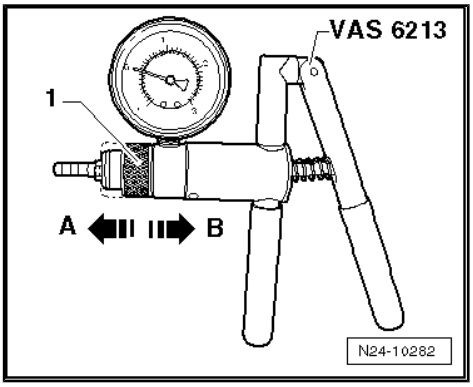
Note

Do not use any thread screws or thread bolts.

– Detach the vacuum hose -arrow- in -I- on the connecting piece of the vacuum pump.



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Note

In order to generate "vacuum", push the ring -1- for the hand vacuum pump - VAS 6213- into position -A-.

– Attach the hand vacuum pump - VAS 6213- to the detached hose and generate a vacuum of 0.06 MPa (0.6 bar).

– Observe the pressure gauge of the hand vacuum pump for approx. 30 seconds.

• The vacuum must not drop.

If the vacuum drops:

– Search for damage, for example a leaky connection in the hose line, and replace the corresponding part.

If the vacuum does not drop:

– First of all, detach the hose at the hand vacuum pump - VAS 6213- .

– Remove one of the plugs from the hose ends.

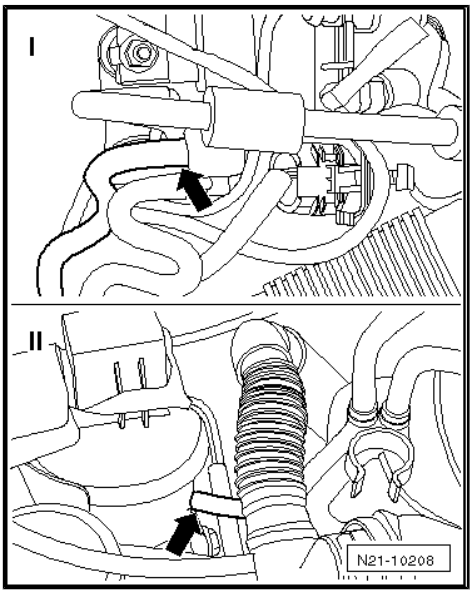
If the non-return valve is functional, a significant spluttering can now be heard when the pressure is compensated for in the vacuum reservoir.

If no spluttering can be heard:

– Replace non-return valve.

– Re-connect all vacuum hoses.

Check the control vacuum line to the exhaust turbocharger



– Detach the hose -arrow- in -I- from the middle connection of the charge pressure control solenoid valve - N75- .

– Detach the hose from the vacuum positioning element of the exhaust turbocharger -arrow- in -II-.

– Close one opening of the hose with a suitable plug.

Note

Do not use any thread screws or thread bolts.

– Attach the hand vacuum pump - VAS 6213- to the other end of the hose and generate a vacuum of 0.06 MPa (0.6 bar).

– Observe the pressure gauge of the hand vacuum pump for approx. 30 seconds.

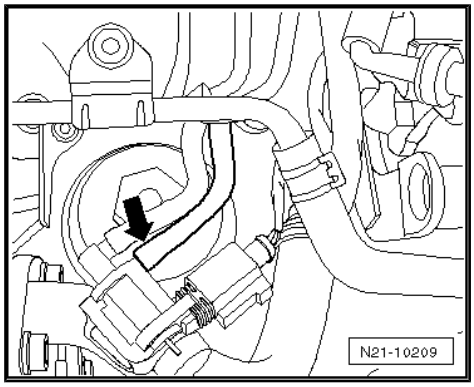
• The vacuum must not drop.

If the vacuum drops:

– Replace vacuum hose.

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Check the control vacuum line to the vacuum setting element for the change-over flap for radiator of exhaust gas recirculation



– Detach the hose on the middle connection of the exhaust gas recirculation radiator change-over valve - N345- -arrow-.

– Attach the hand vacuum pump - VAS 6213- to the detached hose and generate a vacuum of 0.06 MPa (0.6 bar).

– Observe the pressure gauge of the hand vacuum pump for approx. 30 seconds.

• The vacuum must not drop.

If pressure drops:

– Detach the vacuum hose on the vacuum setting element for the change-over flap for radiator of exhaust gas recirculation.

– Attach the hand vacuum pump - VAS 6213- with the factory-delivered test hose (included in the scope of delivery) to the vacuum setting element and generate a vacuum of 0.06 MPa (0.6 bar).

Note

♦ *The adjustment on the vacuum setting element must be noticeable and the vacuum must not drop. If this is not the case, replace the exhaust gas recirculation radiator*
⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348 .

♦ *If no defect can be found on the vacuum setting element, replace the vacuum line of the changeover valve for radiator of exhaust gas recirculation - N345- .*

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2 Charge-air system

⇒ “2.1 Summary of components - charge air cooler (Octavia II, Yeti)”, page 255

⇒ “2.2 Summary of components - charge air cooler (Superb II)”, page 256

⇒ “2.3 Hose connections with screw clamps”, page 257

⇒ “2.4 Removing and installing charge air cooler”, page 257

⇒ “2.5 Removing and installing charge pressure encoder G31 with intake air temperature encoder G42 ”, page 258

⇒ “2.6 Checking the charge-air system for leak-tightness”, page 259

2.1 Summary of components - charge air cooler (Octavia II, Yeti)

1 - Charge air cooler

- ❑ Removing and installing ⇒ “2.4 Removing and installing charge air cooler”, page 257

2 - Right charge air hose

3 - Screw clamp

- ❑ Tightening torque ⇒ “2.3 Hose connections with screw clamps”, page 257

4 - to throttle valve control unit - J338-

5 - Connecting hose

6 - Screw

- ❑ 5 Nm

7 - Charge pressure sender - G31- with intake air temperature sender - G42-

- ❑ Replace O-ring after removal

8 - Rubber bowl

- ❑ replace if damaged

9 - Screw

- ❑ 10 Nm

10 - Right charge air pipe

11 - Connecting hose

12 - from exhaust turbocharger

13 - Left charge air pipe

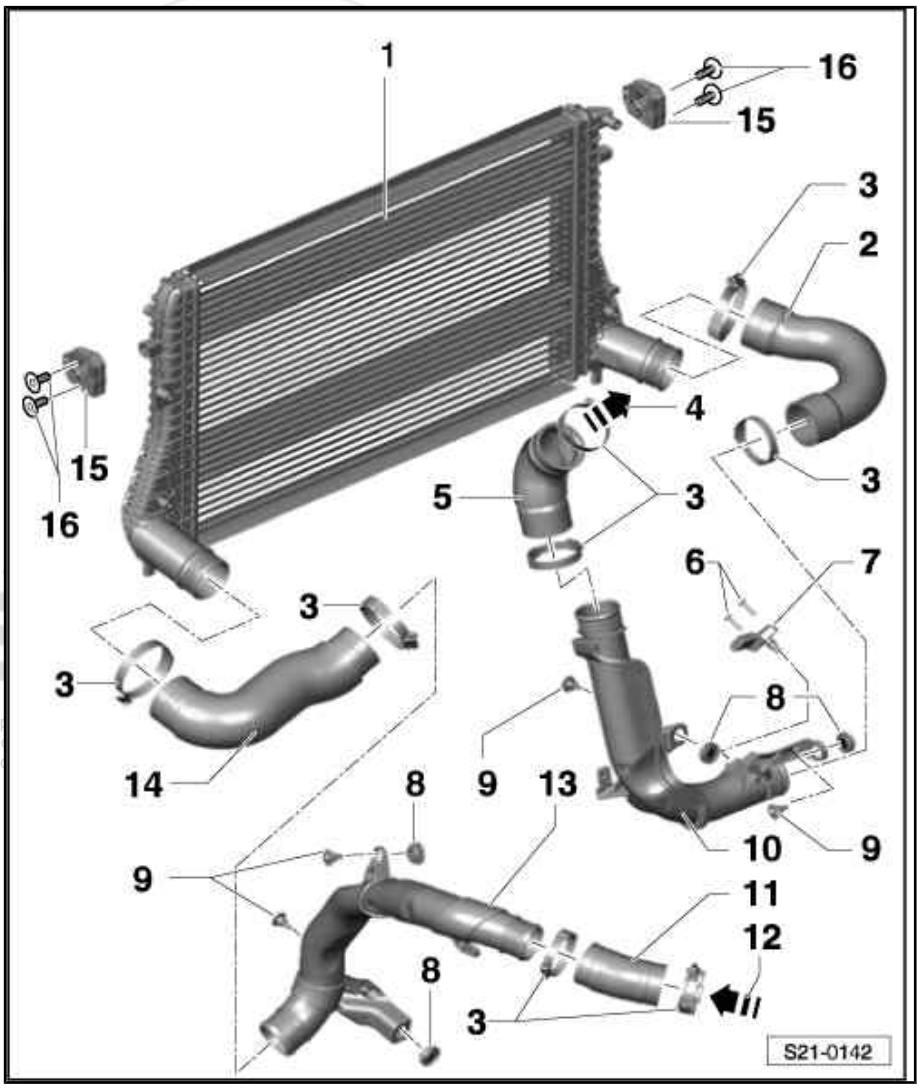
14 - Left charge air hose

15 - Mounting bracket

- ❑ Check fitting position

16 - Screw

- ❑ 5 Nm



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2.2 Summary of components - charge air cooler (Superb II)

1 - Connecting hose

2 - Left charge air pipe

3 - Bushing

4 - Screw

- ❑ 10 Nm

5 - Rubber bowl

- ❑ replace if damaged

6 - Left charge air hose

7 - bottom seal

8 - Charge air cooler

- ❑ Removing and installing ⇒ “2.4 Removing and installing charge air cooler”, page 257

9 - top seal

10 - Screw

- ❑ 5 Nm

11 - Mounting bracket

- ❑ Check fitting position

12 - Storage

13 - Right charge air hose

14 - Connecting hose

15 - Right charge air pipe

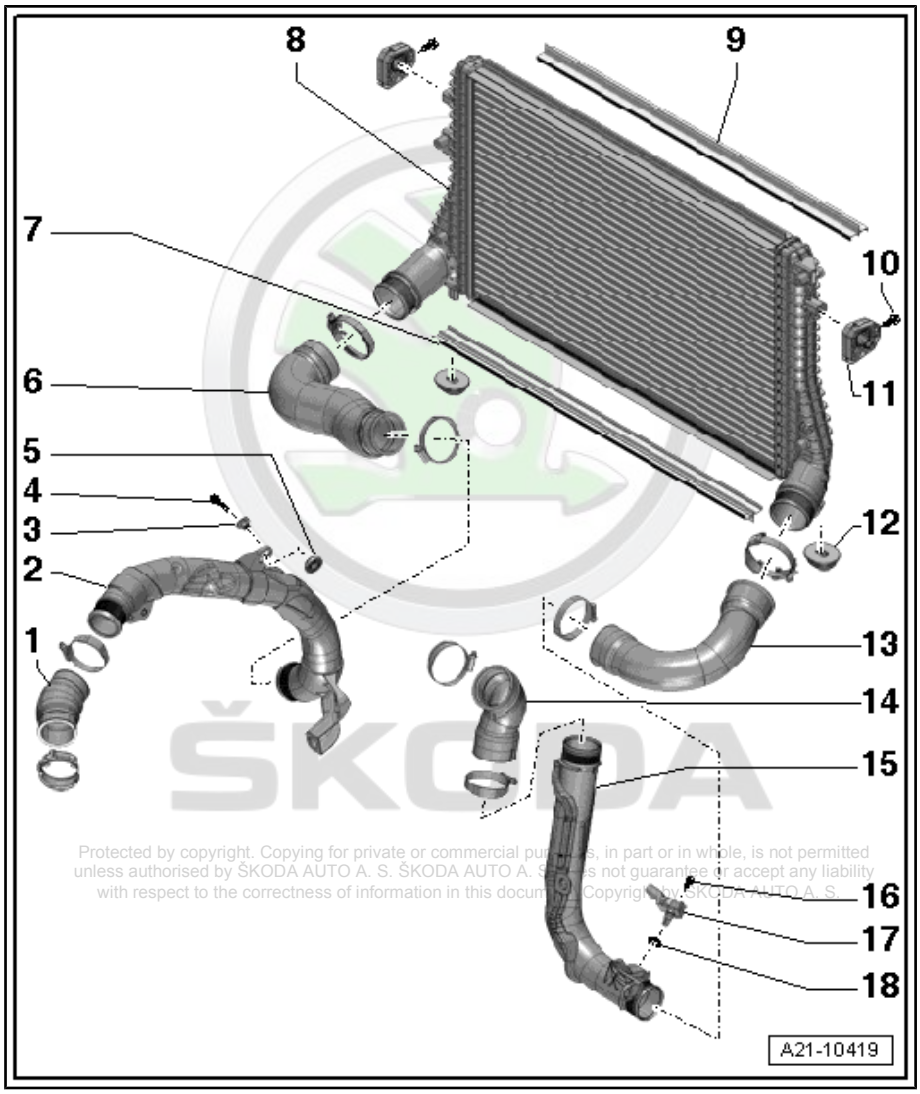
16 - Screw

- ❑ 5 Nm

17 - Charge pressure sender - G31- with intake air temperature sender - G42-

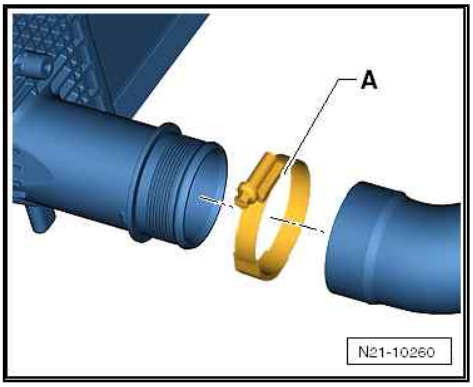
18 - O-ring

- ❑ Replace after disassembly



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2.3 Hose connections with screw clamps



Note

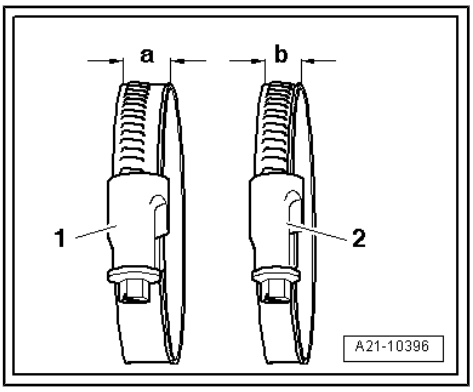
- *Connections, charge air pipes and hoses of charge air system must be free of oil and grease before being installed.*
- *Only install approved screw clamps for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *In order to secure the charge air hoses on their connection fittings, the threads must be treated with rust solvent if the screw clamps have been used beforehand.*
- *After a repair, check all the charge air pipes, charge air hoses and vacuum lines for tight connection and leaks.*

Caution

The screw clamps -A- on the charge air hoses must definitely be precisely tightened in accordance with the specifications ***⇒ page 257*** ***.***

- ***A too low or on the contrary, a too high tightening torque of the screw clamps, may result in the charge air hose slipping off the fluted pipe or the charge air pipe while driving.***

Tightening torques of screw clamps



1 - Screw clamp -a- = 12 mm wide: 5.5 Nm

2 - Screw clamp -b- = 9 mm wide: 3 Nm

2.4 Removing and installing charge air cooler

Removing

– Remove radiator
⇒ “3.4 Removing and installing radiator”, page 177 .

– Remove front bumper ⇒ Body Work; Rep. gr. 63 .

Yeti vehicles

– Remove front headlights ⇒ Electrical system; Rep. gr. 94 .

Continued for all vehicles

– Remove the charge air hoses on the left and right from the charge air cooler.

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Vehicles with air conditioning

WARNING

Do not open the refrigerant circuit of the air conditioning system.

Caution

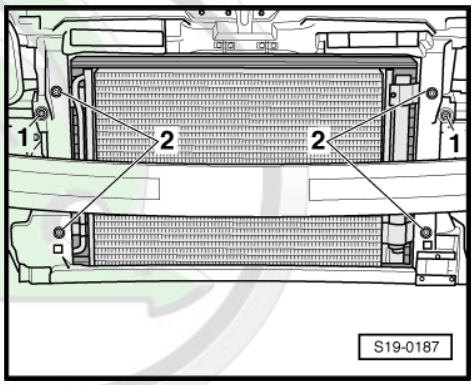
To prevent damage to condenser or to refrigerant lines/hoses, ensure that the lines and hoses are not stretched, kinked or bent.

– Screw out the fixing screws -2- of the condenser.

Continued for all vehicles

– Release fixing screws at charge air cooler:

- Superb II from front left and right -1-.
- Octavia II and Yeti from the sides on the left and right, see -Pos. 16-
⇒ “2.1 Summary of components - charge air cooler (Octavia II, Yeti)”, page 255 .



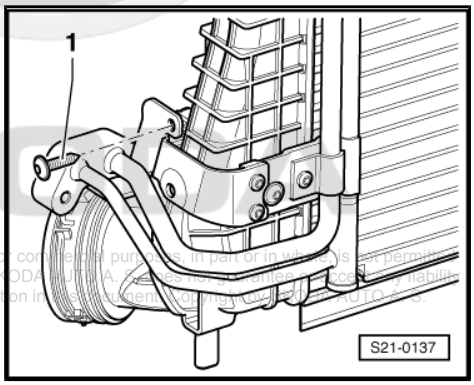
Vehicles with air conditioning

– Press off the charge air cooler from the lock carrier with the assistance of a 2nd mechanic so that the screw -1- for attaching the pipes of the air conditioning system to the radiator is accessible.

– Unscrew bolt -1-.

Continued for all vehicles

– Carefully remove radiator downwards.



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Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Replace O-rings.*
- *Observe the mounting sequence for hose connections with screw clamps*
⇒ “2.3 Hose connections with screw clamps”, page 257 .

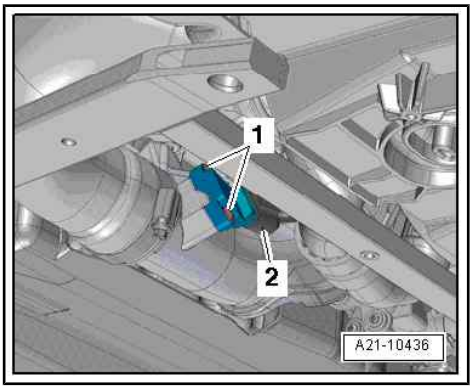
2.5 Removing and installing charge pressure encoder - G31- with intake air temperature encoder - G42-

Removing

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Disconnect plug connection -2-.

– Remove screws -1- and remove charge pressure encoder - G31- from the air duct with intake air temperature encoder - G42- .



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

– Renew O-ring.

– Install the noise insulation ⇒ Body Work; Rep. gr. 50 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Charge pressure encoder - G31- with intake air temperature encoder - G42-
- Octavia II, Yeti
  ⇒ “2.1 Summary of components - charge air cooler (Octavia II, Yeti)”, page 255 .
- Superb II
  ⇒ “2.2 Summary of components - charge air cooler (Superb II)”, page 256 .

2.6 Checking the charge-air system for leak-tightness

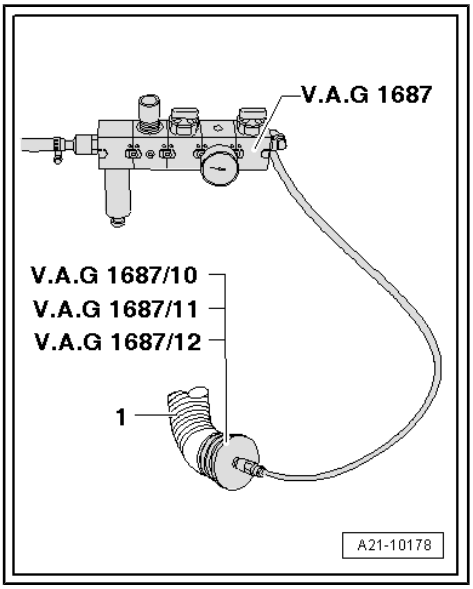
Special tools and workshop equipment required

- Charge-air system testing device , e. g. -V.A.G 1687-
- Adapter , e.g. -V.A.G 1687/10-

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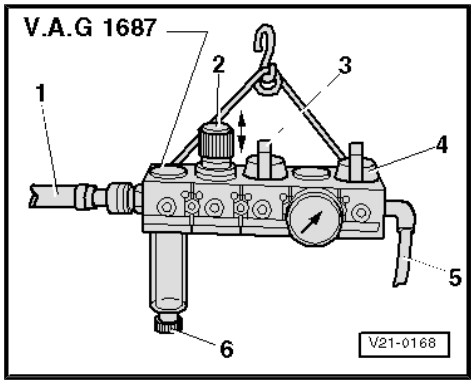
– Remove the intake hose -1- from the air filter.

– Fit adapter - 1687/10- into the intake hose -1- and secure with a hose clamp.



Prepare tester for charge air system - V.A.G 1687- as follows:

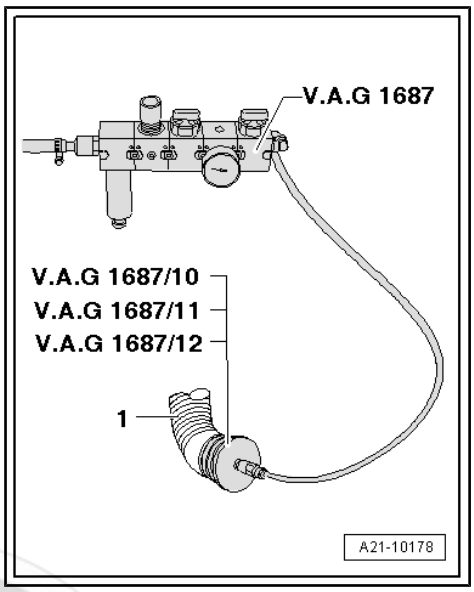
– Unscrew pressure control valve -2- fully and close the valves -3- and -4-.



Note

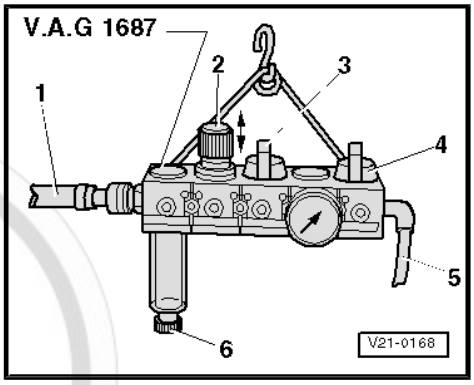
The rotary knob must be pulled to the top in order to rotate the pressure control valve -2-.

– Connect tester for charge air system - V.A.G 1687- as shown to adapter - 1687/10- .



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– Connect the feed hose for the compressed air -1- to the tester.



Note

If there is water in the transparent drain container, drain water via the drain plug -6-.

– Open valve -3-.

– Set the pressure to 0,05 MPa (0,5 bar) with the pressure control valve -2-.

Caution

The pressure must not be greater than 0.05 MPa (0.5 bar)! A too high pressure can damage the engine.

– Open valve -4- and wait until the test circuit is filled. If necessary, re-adjust the pressure to 0.05 MPa (0.5 bar).

– Charge-air system:

- visually, through listening and touching,
- with commercially available leak search spray, or with the ultrasonic measuring device , e.g. -V.A.G 1842- ,

check for leak points.

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Note

- *Minor leaks are permissible on the suction side of the turbocharger, because the intake hoses are not designed for overpressure.*
- *A small amount of air penetrates via the inlet valves into the engine. For this reason no pressure test is possible.*
- *Using the ultrasonic tester - V.A.G 1842- ⇒ Owner's Manual .*
- *In case of a leak point, observe the instructions for charge air system ⇒ "3.5 General instructions for charge air system", page 7 during the installation.*
- *Before removing the adapter - 1687/10- by loosening the hose clamp, release the pressure in the test circuit.*

23 – Mixture preparation - injection

1 Injection system

⇒ “1.1 Installation location overview”, page 262

⇒ “1.2 System overview”, page 264

⇒ “1.3 Filling/bleeding the fuel system”, page 266

⇒ “1.4 Removing and installing the engine speed transmitter G28 ”, page 266

1.1 Installation location overview

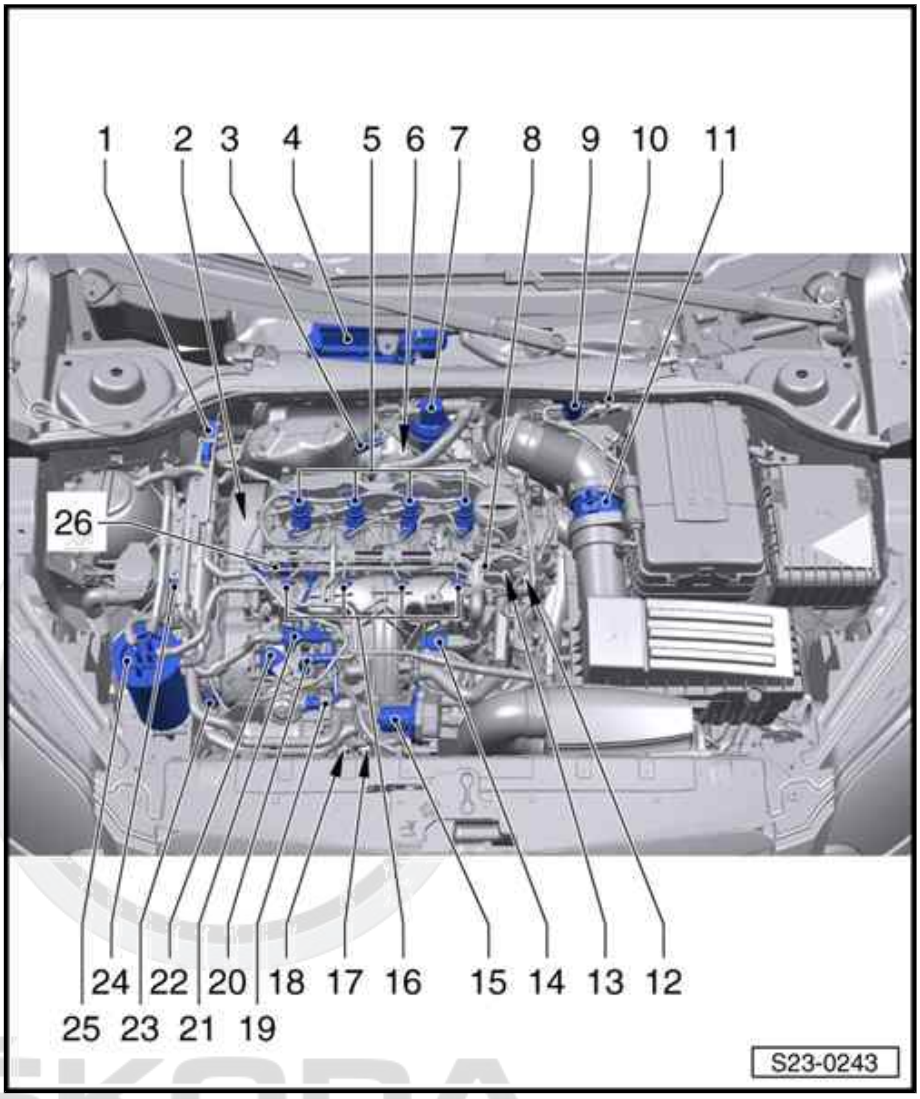
The control unit is equipped with event memory. Before repairs, setting operations and fault finding, query the event memory and run self-diagnosis ⇒ Vehicle diagnostic tester.

Note

- *Faults can be detected by the control unit as checking and adjustment work is being undertaken and then saved. It is therefore essential to read and delete the fault memory after completing all checking and adjustment work ⇒ Vehicle diagnostic tester.*
- *Observe the safety precautions when working on the diesel direct injection system ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .*

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1 - Differential pressure transmitter - G505-

- ❑ only installed on engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

2 - Hall sender - G40- (camshaft position sensor)

3 - Lambda probe - G39-

- ❑ only on engines with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA

4 - Engine control unit - J623-

5 - Injection units

- ❑ Injection valve for cylinder 1 - N30-
- ❑ Injection valve for cylinder 2 - N31-
- ❑ Injection valve for cylinder 3 - N32-
- ❑ Injection valve for cylinder 4 - N33-

6 - Exhaust gas return valve - N18-

- ❑ consists of:

- ♦ mechanical valve (electrically operated)
- ♦ Exhaust gas recirculation control motor - V338-
- ♦ Exhaust gas recirculation potentiometer - G212-

7 - Position transmitter for charge pressure regulator - G581-

8 - Control valve for fuel pressure - N276-

9 - Solenoid valve for charge pressure control - N75-

10 - Connector

- ❑ for exhaust gas temperature sender 4 - G648- (only on engine with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA)
- ❑ for exhaust gas temperature sender 1 - G235- (Temperature sender upstream turbocharger - G507-)
- ❑ for lambda probe - G39- (only on engine with identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA)

11 - Air mass meter - G70-

12 - Coolant temperature transmitter - G62-

13 - Engine speed transmitter - G28-

- ❑ Removing and installing ⇒ “1.4 Removing and installing the engine speed transmitter G28 ”, page 266

14 - Changeover valve for radiator of exhaust gas recirculation - N345-

15 - Throttle valve control unit - J338-

16 - Glow plugs

- ❑ Glow plug 1 - Q10-
- ❑ Glow plug 2 - Q11-

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- ❑ Glow plug 3 - Q12-
- ❑ Glow plug 4 - Q13-

17 - Coolant recirculation pump 2 - V178-

18 - Charge pressure sender - G31- with intake air temperature sender - G42-

19 - Connection of high pressure line

- ❑ to fuel rail

20 - Connection of high pressure line

- ❑ from fuel filter

21 - Fuel temperature transmitter - G81-

22 - High pressure pump with fuel dosage valve - N290-

23 - Coolant temperature sender at radiator outlet - G83-

24 - Additional fuel pump - V393- or fuel pump 2 - V277-

25 - Fuel filter

- ❑ on engines conforming to exhaust emission standard BS-4 with drain plug

26 - Fuel pressure transmitter - G247-

1.2 System overview

Caution

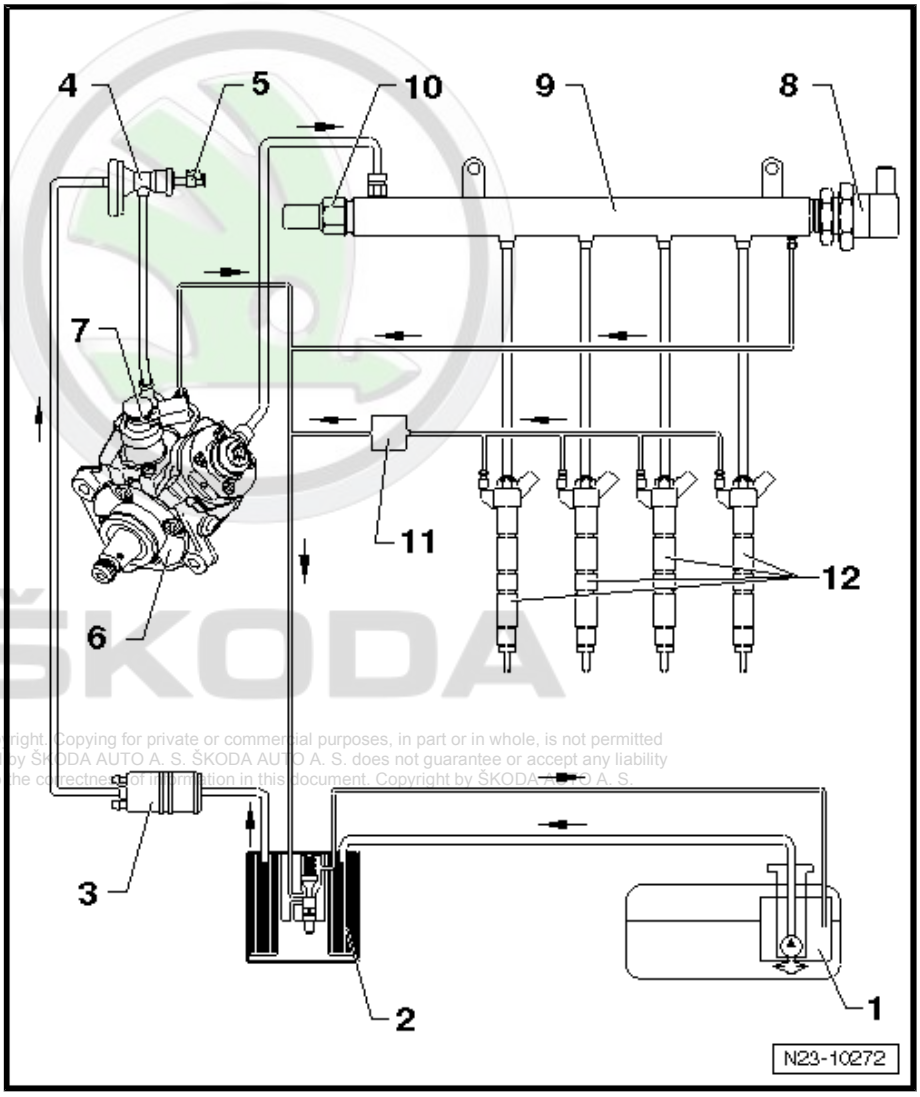
In order to avoid the high pressure pump to run dry and to achieve a quick engine start after parts are replaced, the following points must be observed:

- *If fuel system between tank and pump parts/components have been removed or replaced the fuel system must be filled/bled before the engine is started up for the first time* *⇒ "1.3 Filling/bleeding the fuel system", page 266* *.*
- *If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start* *⇒ "1.3 Filling/bleeding the fuel system", page 266* *.*
- *If the high pressure system was opened, it must be checked for tightness* *⇒ "2.4 Check the fuel system for tightness", page 276* *.*

WARNING

Absolutely observe the safety precautions when working on the diesel direct injection system *⇒ "2.1 Safety precautions when working on fuel supply system", page 4* *.*

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1 - Fuel tank

- ❑ With fuel system pressurisation pump - G6-

2 - Fuel filter

- ❑ on engines conforming to exhaust emission standard BS-4 with drain plug
- ❑ pay attention to part number of filter element ⇒ ETKA - Electronic catalogue of original parts
- ❑ Change intervals:

- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti

- ❑ Drain fuel filter:

- ♦ ⇒ Maintenance ; Booklet Octavia II
- ♦ ⇒ Maintenance ; Booklet Superb II
- ♦ ⇒ Maintenance ; Booklet Yeti

3 - Additional fuel pump - V393- or fuel pump 2 - V277-

4 - Filter sieve

5 - Fuel temperature transmitter - G81-

- ❑ Removing and installing ⇒ “2.16 Removing and installing fuel temperature transmitter G81 ”, page 297

6 - High pressure pump

- ❑ an initial fuel filling must be carried out after the replacement (running dry must be avoided in all cases) ⇒ “1.3 Filling/bleeding the fuel system”, page 266
- ❑ Removing and installing ⇒ “2.3 Removing and installing the high pressure pump”, page 273

7 - Fuel dosage valve - N290-

8 - Control valve for fuel pressure - N276-

- ❑ Removing and installing ⇒ “2.15 Replace fuel pressure regulating valve N276 ”, page 295
- ❑ Check ⇒ “2.14 Check fuel pressure regulating valve N276 ”, page 294 .

9 - Fuel distributor

10 - Fuel pressure transmitter - G247-

- ❑ Removing and installing ⇒ “2.13 Removing and installing fuel pressure sender G247 ”, page 292

11 - Non-return valve

- ❑ for holding pressure approx. 0.03...0.12 MPa (0.3...1.2 bar)
- ❑ the pressure holding valve must only be replaced complete with the fuel return-flow line ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ after an exchange, the engine must run at idling speed for approx. 2 minutes in order to vent the fuel system; afterwards check the fuel return-flow line for tightness

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12 - Injection units

- ❑ Removing and installing ⇒ “2.10 Removing and installing the injection units”, page 284

1.3 Filling/bleeding the fuel system

Caution

In order to prevent the high pressure pump from running dry (very narrow tolerances) and to achieve a quick engine start after parts are replaced, the following must be observed:

- ♦ *If fuel system between tank and pump parts/components have been removed or replaced the fuel system must be filled/bled before the engine is started up for the first time.*

In order to fill up the high pressure pump with fuel, proceed as follows:

- Vehicle must be refuelled.

– Connect vehicle diagnosis tester and switch on ignition system.

– Perform `bleed fuel tank` targeted function.

- The fuel pump activates.
- The fuel pump must run for approximately 3 minutes to ensure that the pump is sufficiently filled with fuel.

– After filling the fuel system, start the engine.

– Run the engine at medium speed for several minutes, then turn it off again.

– Test fuel system for tightness ⇒ “2.4 Check the fuel system for tightness”, page 276 .

– Delete event memory entry with Vehicle diagnosis tester .

– Afterwards, carry out a test drive with at least one full load acceleration.

– Then check the high-pressure system again for air-tightness.

Note

If air is still present in the fuel system the engine may enter dry-running operation during the test drive. Switch off engine and delete the event memory. Then proceed with the test drive.

– Delete event memory entry with Vehicle diagnosis tester .

1.4 Removing and installing the engine speed transmitter - G28-

Special tools and workshop equipment required

- ♦ Hose clamps up to ∅ 25 mm - MP7-602 (3094)-
- ♦ Hose strap pliers , e.g. -VAS 6362-
- ♦ Catch pan , e.g. -VAS 6208-
- ♦ Socket - T10370-
- ♦ Assembly tool - T10118-

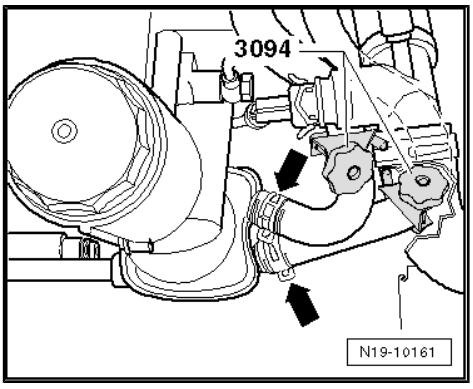
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Removing

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Clamp off coolant hoses from the engine oil cooler with hose clamp up to 25 mm diameter - MP7-602 (3094)- .

– Detach hose clamps -arrows- with hose clamp pliers , e.g. -VAS 6362- .



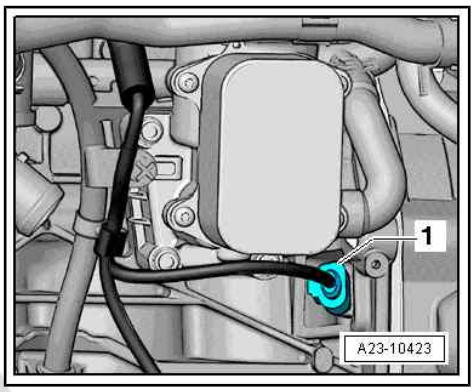
Note

Catch leaking coolant in the drip tray , e.g. -VAS 6208- .

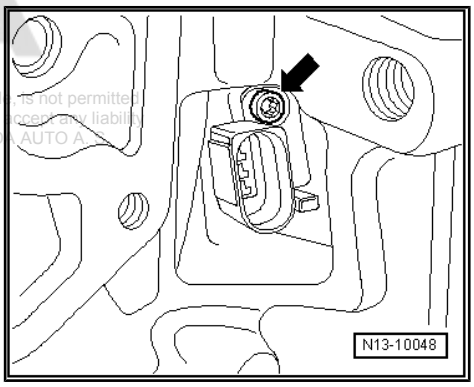
– Detach coolant hoses from engine oil cooler.

– Remove oil filter holder
⇒ “1.5 Removing and installing the oil filter holder with the engine oil cooler”, page 133 .

– Disconnect the plug -1- on the engine speed sender - G28- with the assembly device - T10118- and lay the electrical cable to the side.



– Unscrew the fixing screw -arrow- of the engine speed sender - G28- and pull out the sender.



Installing

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Assembly is carried out in the reverse order. When installing, observe the following:

– Check the level of coolant and top up if necessary
⇒ “1.3 Draining and filling coolant”, page 160 .

Tightening torques - summaries of components

♦ Screw for engine speed sender - G28-
⇒ “2.2 Summary of components - sealing flange on the gearbox side”, page 62 .

2 Fuel system, engine side

⇒ “2.1 Summary of components - high pressure pump”, page 268

⇒ “2.2 Summary of components - injection units”, page 270

⇒ “2.3 Removing and installing the high pressure pump”, page 273

⇒ “2.4 Check the fuel system for tightness”, page 276

⇒ “2.5 Adaptation for injector quantity adjustment (IQA code)”, page 277

⇒ “2.6 Always search for injection units in open state”, page 277

⇒ “2.7 Checking the injection units in open state”, page 279

⇒ “2.8 Check injection unit return quantity with engine running”, page 280

⇒ “2.9 Check injection unit return flow quantity at starter speed”, page 283

⇒ “2.10 Removing and installing the injection units”, page 284

⇒ “2.11 Installing the high pressure lines”, page 289

⇒ “2.12 Removing and installing the fuel distributor”, page 291

⇒ “2.13 Removing and installing fuel pressure sender G247 ”, page 292

⇒ “2.14 Check fuel pressure regulating valve N276 ”, page 294

⇒ “2.15 Replace fuel pressure regulating valve N276 ”, page 295

⇒ “2.16 Removing and installing fuel temperature transmitter G81 ”, page 297

⇒ “2.17 Removing and installing air flow mass meter G70 ”, page 298

⇒ “2.18 Testing the pressure of the high pressure pump”, page 298

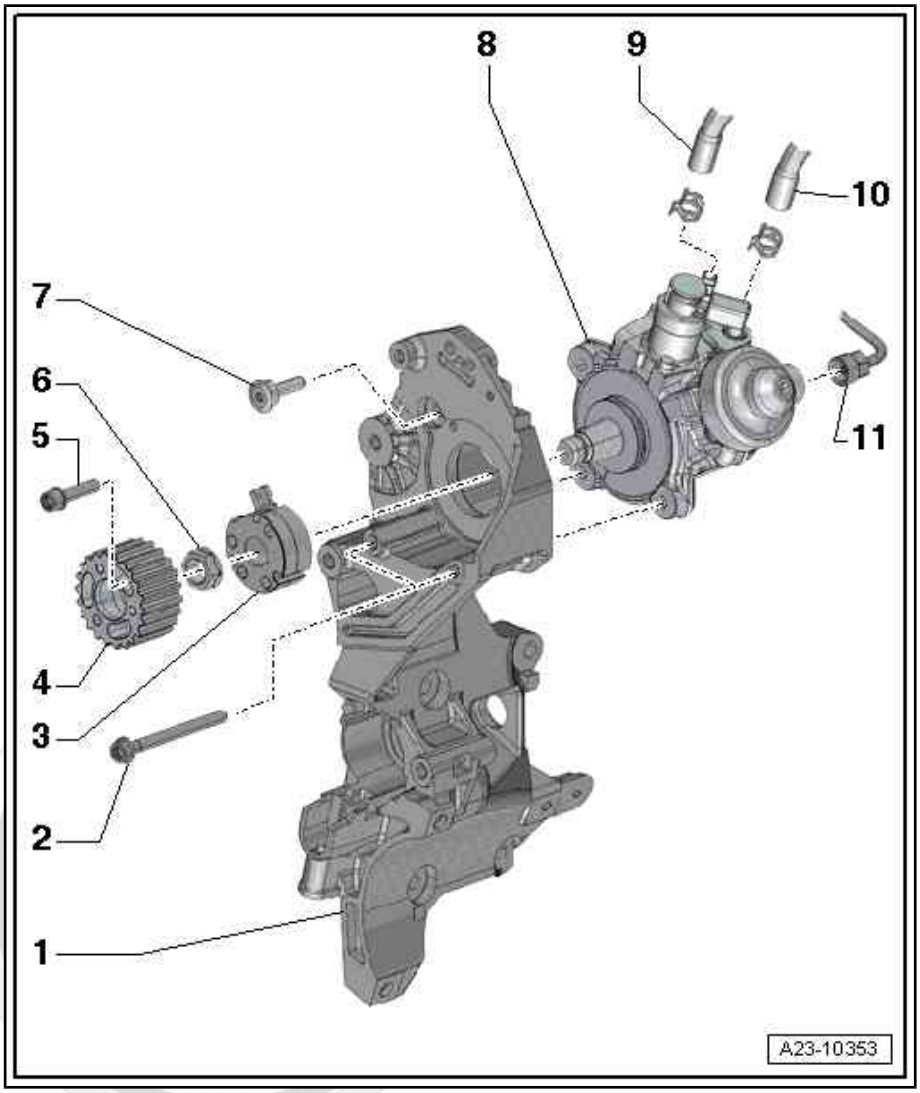
2.1 Summary of components - high pressure pump

Caution

In order to avoid the high pressure pump to run dry and to achieve a quick engine start after parts are replaced, the following points must be observed:

- *If fuel system between tank and pump parts/components have been removed or replaced the fuel system must be filled/bled before the engine is started up for the first time ⇒ “1.3 Filling/bleeding the fuel system”, page 266 .*
- *If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start ⇒ “1.3 Filling/bleeding the fuel system”, page 266 .*
- *If the high pressure system was opened, it must be checked for tightness ⇒ “2.4 Check the fuel system for tightness”, page 276 .*

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1 - Bracket for auxiliary units

2 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 180°

3 - Hub

- ❑ with transmitter ring
- ❑ to release and tighten use counterholder - T10051-
- ❑ to remove use extractor - T40064-

4 - Toothed belt pulley high pressure pump

5 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm

6 - Nut

- ❑ 95 Nm

7 - Screw

- ❑ Replace after disassembly
- ❑ 20 Nm + 45°

8 - High pressure pump

- ❑ with fuel dosage valve - N290-
- ❑ Removing and installing ⇒ “2.3 Removing and installing the high pressure pump”, page 273
- ❑ Pressure test ⇒ “2.18 Testing the pressure of the high pressure pump”, page 298

Caution

Risk of damage to the high pressure pump from running dry.
If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start *⇒ “1.3 Filling/bleeding the fuel system”, page 266* *.*

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9 - Fuel intake hose

10 - Fuel return-flow hose

11 - Fuel high pressure line

- ❑ between the high pressure pump and the fuel distributor
- ❑ do not install under tension
- ❑ Tighten union nuts in one work step without time delay between tightening and torquing angle (max. 1 min)
- ❑ first of all tighten the union nut on the side of the high pressure pump

- ❑ only tighten the fixing screw after tightening both union nuts

Note

- ♦ *The high pressure line can be re-used after the following tests:*
- ♦ *Check the sealing cones and the union nuts for damage, deformations and tears.*
- ♦ *The inner line boring must not be deformed, constricted or damaged.*
- ♦ *A corroded high pressure line must not be reinstalled.*

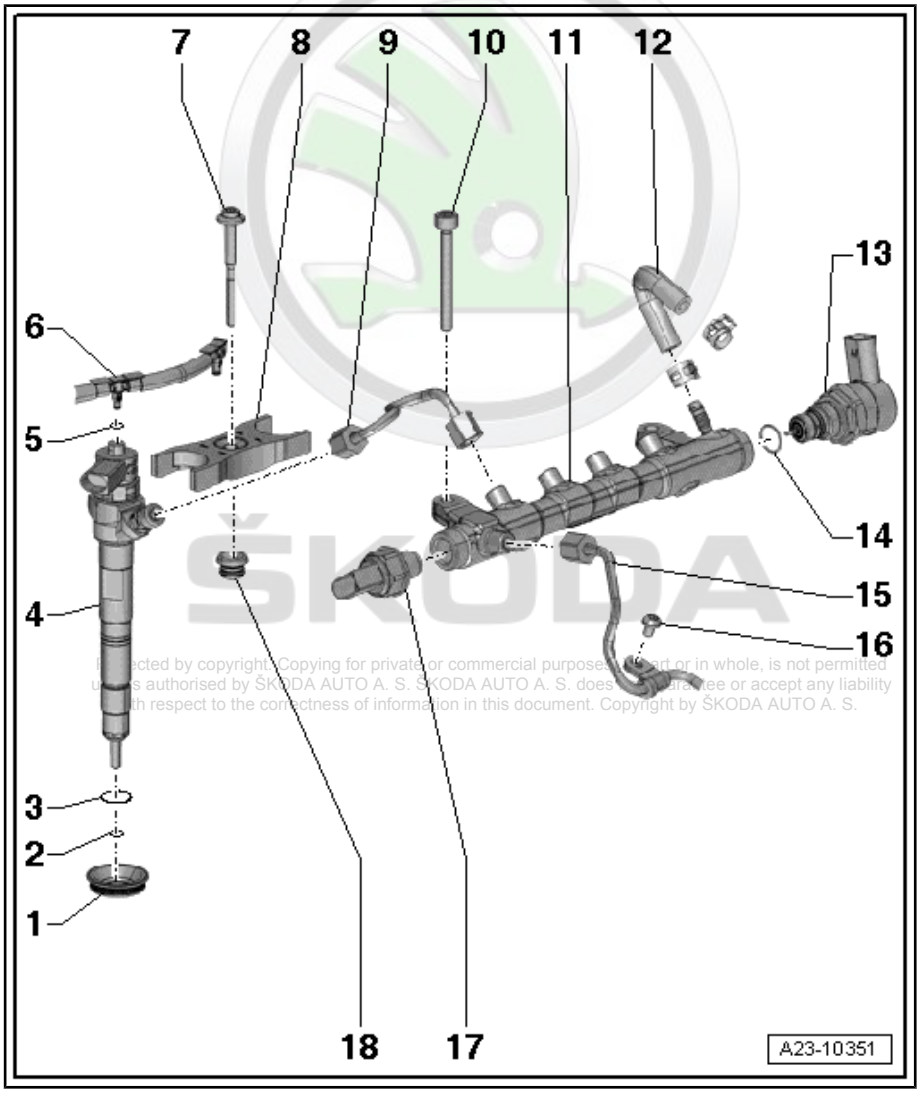
- ❑ 28 Nm

2.2 Summary of components - injection units

Caution

When installing a new stripped engine and after fitting the high pressure lines, it is absolutely necessary to tighten the screws -position 7- for the clamping claws of the injection units to the specified tightening torque ⇒ page 88 . In order to align the injection units when fitting the high pressure lines, the clamping claws of the stripped engine are only tightened in series »by hand«. If the screws of the clamping claws are not tightened to the specified tightening torque, the engine may be damaged.

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1 - Sealing ring

- ❑ in the cylinder head cover
- ❑ Replace ⇒ “1.4 Replacing sealing rings for injection units”, page 94

2 - Copper seal

- ❑ Replace after disassembly

3 - O-ring

- ❑ Replace after disassembly

4 - Injection unit

- ❑ do not mix up - when removing, mark the fitting position of the pair of injection units and the clamping claw
- ❑ Removed injection units and clamping claws may only be installed in the same place
- ❑ Each time you install the injection unit, replace the following: copper washer, O-ring for injection unit hole in head, O-ring for fuel return pipe connection
- ❑ When replacing the injection unit, replace the following: copper washer, O-ring for injection unit hole in the head, O-ring for the fuel return pipe connection
- ❑ when replacing the injection unit, adaptation according to the code “injector quantity adjustment IQA” must also be carried out ⇒ “2.5 Adaptation for injector quantity adjustment (IQA code)”, page 277
- ❑ Removing and installing ⇒ “2.10 Removing and installing the injection units”, page 284
- ❑ always search for injection units in open state ⇒ “2.6 Always search for injection units in open state”, page 277
- ❑ check the injection units in open state ⇒ “2.7 Checking the injection units in open state”, page 279

Note

Pay attention when re-using the injection units ⇒ page 286 .

5 - O-ring

- ❑ Replace after disassembly

6 - Fuel return-flow line

- ❑ from the injection units
- ❑ with pressure holding valve approx. 0.03...0.12 MPa (0.3...1.2 bar)
- ❑ Removing and installing ⇒ “2.10 Removing and installing the injection units”, page 284
- ❑ must not be kinked, damaged or blocked
- ❑ do not dismantle, the pressure holding valve must only be replaced complete with the fuel return-flow line ⇒ ETKA - Electronic Catalogue of Original Parts

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- ❑ after an exchange, the engine must run at idling speed for approx. 2 minutes in order to vent the fuel system; afterwards check the fuel return-flow line for tightness

7 - Screw

- ❑ together with 2 injection units
- ❑ Replace after disassembly
- ❑ before tightening, first of all tighten the union nuts of the high pressure lines
- ❑ 8 Nm + 270°

8 - Clamping claw

- ❑ together with 2 injection units
- ❑ do not exchange - when removing, mark fitting position
- ❑ Removed injection units and clamping claws may only be installed in the same place
- ❑ Check fitting position ⇒ page 273

9 - High pressure line

- ❑ between fuel distributor and injection unit
- ❑ do not exchange - when removing, mark
- ❑ when slackening the union nut at the injection unit, counterhold the connection fitting with a fixed spanner
- ❑ do not install under tension
- ❑ first of all tighten the union nut on the side of the injection unit
- ❑ 28 Nm

Note

- *Pay attention to the cylinder specific marking when re-using the high pressure lines.*
- *The high pressure lines can be re-used after the following tests:*
- *Check the sealing cones and the union nuts for damage, deformations and tears.*
- *The inner line boring must not be deformed, constricted or damaged.*
- *The corroded injection lines must not be re-used.*

10 - Screw

- ❑ 22 Nm

11 - Fuel distributor

- ❑ Removing and installing ⇒ “2.12 Removing and installing the fuel distributor”, page 291
- ❑ Tighten the fixing screws Pos. -10- only after tightening the union nuts for the high pressure lines Pos. -9- and the union nuts of the high pressure line Pos. -15-

12 - Fuel return-flow hose

13 - Control valve for fuel pressure - N276-

- ❑ cannot be re-used, replace after removal
- ❑ Replace ⇒ “2.15 Replace fuel pressure regulating valve N276 ”, page 295
- ❑ 80 Nm

14 - O-ring

- ❑ Replace after disassembly

15 - High pressure line

- ❑ between the high pressure pump and the fuel distributor

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- ❑ do not install under tension
- ❑ first of all tighten the union nut on the side of the high pressure pump, to do so counterhold the connection fitting
- ❑ Only tighten the fixing screw Pos. -16- of the clamp after tightening both union nuts

Note

- ♦ *The high pressure lines can be re-used after the following tests:*
- ♦ *Check the sealing cones and the union nuts for damage, deformations and tears.*
- ♦ *The inner line boring must not be deformed, constricted or damaged.*
- ♦ *A corroded high pressure line must not be reinstalled.*

- ❑ 28 Nm

16 - Screw

- ❑ 8 Nm

17 - Fuel pressure transmitter - G247-

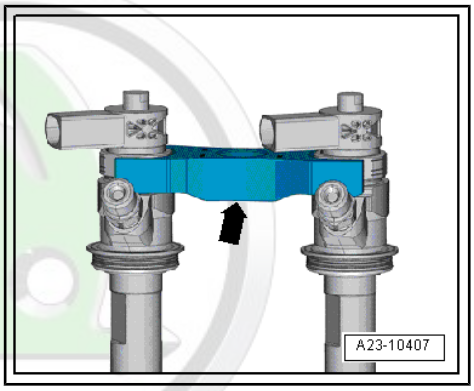
- ❑ Removing and installing ⇒ “2.13 Removing and installing fuel pressure sender G247 ”, page 292
- ❑ 100 Nm

18 - Grommet

- ❑ in the cylinder head cover

Fitting position of the clamping claw

- The clamping claw with 2 injection units.
- The thickening -arrow- of the clamping claw points downwards.



2.3 Removing and installing the high pressure pump

Special tools and workshop equipment required

- ♦ Counterholder - T10051-
- ♦ Extractor - T40064-
- ♦ Thrust piece - T40064/1-
- ♦ Cylinder head screws - T40064/2-
- ♦ Socket insert XZN 10 - T10385-

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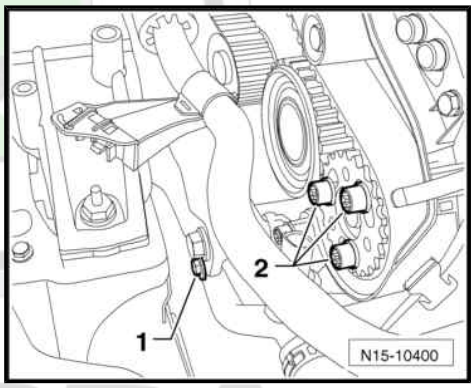
Removing

Note

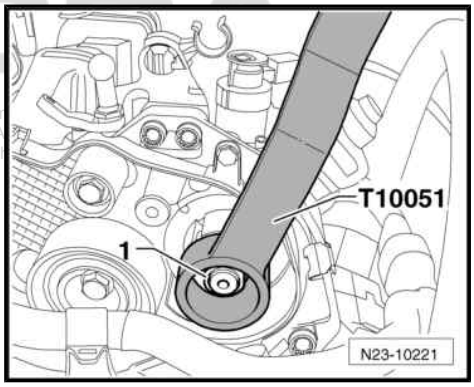
- *Safety precautions when working on the fuel supply system*
  ⇒ *“2.1 Safety precautions when working on fuel supply system”, page 4* .
- *Observe rules for cleanliness*
  ⇒ *“3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6* .

– Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump
⇒ “1.7 Removing and installing toothed belt”, page 49 .

– Release screws -2- and remove timing belt gear from the high pressure pump.



– Hold the hub of the high pressure pump with the counterholder - T10051- and unscrew the securing nut -1-.



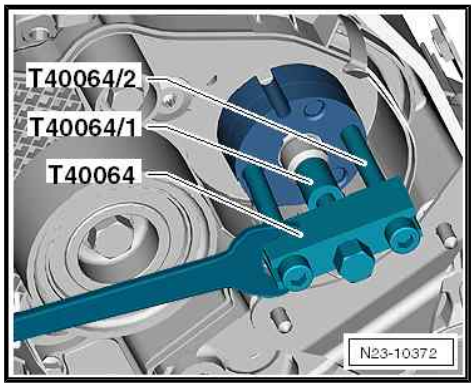
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Note

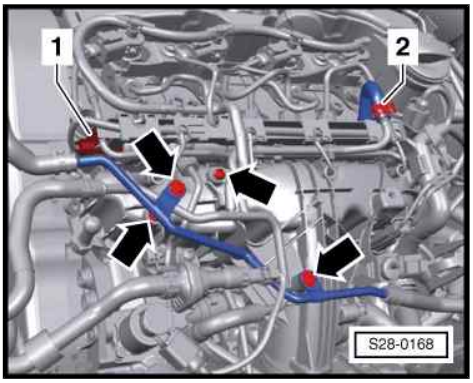
Replace the basic pressure plate with the pressure plate - T40064- on the extractor - T40064/1- .

– Position extractor - T40064- with thrust piece - T40064/1- and cylinder screws (bolts) - T40064/2- as shown.

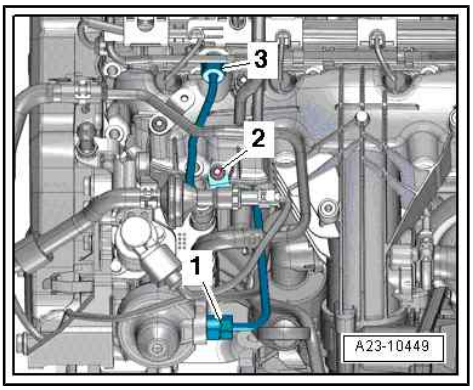
– Detach the hub from the high pressure pump, if necessary counterhold with a fixed spanner SW 24.



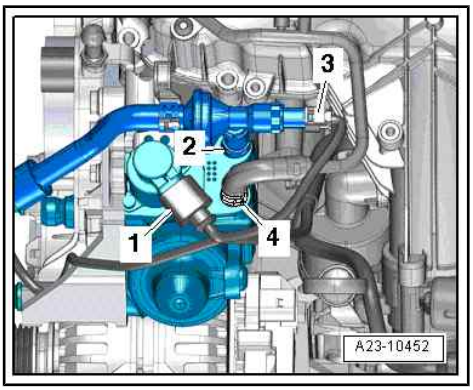
– Remove screws -arrows-.
– Lay the coolant return-flow line and the fuel return-flow line to the side.



– Release screw -2- and union nuts -1- and -3- and remove high pressure line.



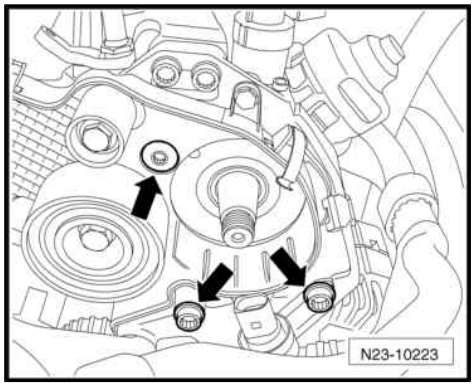
– Disconnect connectors -1- and -3-.
– Remove fuel intake hose -2- and fuel return-flow hose -4-.



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– Release the fixing screws -arrows- of the high pressure pump.

– Carefully remove the high pressure pump.



Installing

Caution

Risk of damage to the high pressure pump from running dry.

- ***If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start***
  ⇒ "1.3 Filling/bleeding the fuel system", page 266 .

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *When installing the high pressure pump, ensure that no dirt penetrates the fuel system.*
- *Only remove the screw plug immediately before installing the fuel lines.*
- *The fixing screws for the high pressure pump must be replaced.*

– Check fuel system for tightness
⇒ "2.4 Check the fuel system for tightness", page 276 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

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- Screws for high pressure pump
  ⇒ "2.1 Summary of components - high pressure pump", page 268 .

2.4 Check the fuel system for tightness

Special tools and workshop equipment required

- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves

Work procedure

WARNING

Wear protective gloves and protective goggles when working with grease remover!

– Degrease all fuel connections.

– Let the engine run at idling speed for a few minutes.

– Carry out a visual inspection of the complete fuel system for leaks after switching off the engine.

If there is leakage despite the correct tightening torque:

– Replace the related component part and repeat the leak check.

If no leaks are found:

– Carry out a test drive with minimum one full load acceleration up to max. speed.

– Then once again carry out a visual inspection of the complete fuel system for leaks.

If there is leakage despite the correct tightening torque:

– Replace the related component part and once again repeat the leak check.

If no leaks are found:

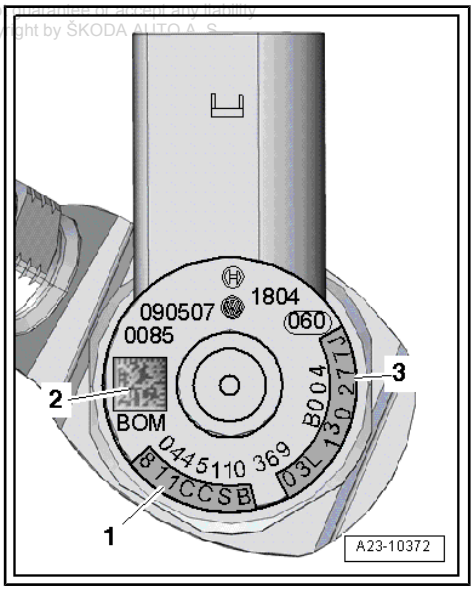
– Query and if necessary erase event memory of engine control unit ⇒ Vehicle diagnostic tester.

2.5 Adaptation for injector quantity adjustment (IQA code)

The function “injector quantity adjustment (IQA)” of the engine control unit with the Common Rail system is used to correct the injection rate for each cylinder of the engine individually in the complete characteristic diagram area and thus to suppress the differences in the fuel dosage of the individual injection units as a result of manufacturing variances.

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Each injection unit is factory-marked with an IQA code -1-.



View from the top of the injection unit

1 - IQA code

2 - Data matrix IQA code

3 - Part number

The specifications provided in the figure are only one example.

After replacing the injection unit, the “IQA code” of the new injection unit must be written into the engine control unit.

After replacing the engine control unit, the “IQA codes” for all the injection units must be written into the new engine control unit.

Adaptation process ⇒ Vehicle diagnostic tester.

Note

At the same time check if the “IQA codes” for all the other injection units are correctly written. If the correct “IQA codes” are stored in the engine control unit, these codes must never be entered again.

2.6 Always search for injection units in open state

Special tools and workshop equipment required

- Insertion tool, wrench size 17 , e.g. -V.A.G 1331/6-
- Screw cap - T40204-
- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves

Observe the rules for cleanliness and the instructions when undertaking all work on the fuel system
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

Note

Pay attention to cleanliness, no dirt must get into the fuel system.

WARNING

Wear protective gloves and protective goggles when working with grease remover!

– Clean all the connections of the high pressure lines on the fuel distributor and on the injection units with grease remover and let all the cleaned parts dry off.

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Note

Check the injection units of all the cylinders one after the other.

Start testing cylinder 1.

- Fit the plug of the injection unit to be checked.

Work procedure

– Unscrew the union nut of the high pressure line of the cylinder to be checked at the fuel distributor.

– Slightly slacken the union nut of the high pressure line of the injection unit to be checked, while doing so hold the connection fitting with an open-end wrench.

– Close the open connection of the high pressure line with a suitable screw plug.

– Close the opened connection fitting on the fuel distributor with screw cap - T40204- .

– Delete all the entries stored in the fault memory of the engine control unit ⇒ Vehicle diagnostic tester.

– Perform a test drive

Note

- *If the correct injection unit is found, no event log entry related to the “positive control deviation” must be stored.*
- *It is possible that other event log entries are made. Do not pay attention to these new event log entries (follow-up fault).*

– After the test drive, read out all the entries stored in the fault memory of the engine control unit ⇒ Vehicle diagnostic tester.

If an entry related to the “positive control deviation” is present in the fault memory:

– Reconnect the high pressure line to the checked injection unit
⇒ “2.11 Installing the high pressure lines”, page 289 .

– Repeat the work procedure for the next injection unit
⇒ page 278 .

If no fault entry “positive control deviation” is stored in the fault memory after the test drive, the correct injection unit was found.

– Replace injection unit
⇒ “2.10 Removing and installing the injection units”, page 284 .

2.7 Checking the injection units in open state

Caution

- *Observe the rules for cleanliness and the instructions when undertaking all work on the fuel system*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .
- *Absolutely observe the rules for cleanliness and the instructions before as well as while undertaking all work.*

Special tools and workshop equipment required

- Hand vacuum pump - VAS 6213-
- Adapter made from the fuel return-flow line

– Delete the entries stored in the fault memory ⇒ Vehicle diagnostic tester.

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

Note

- *Pay attention to cleanliness, no dirt must get into the fuel system.*
- *Check all the cylinders one after the other.*

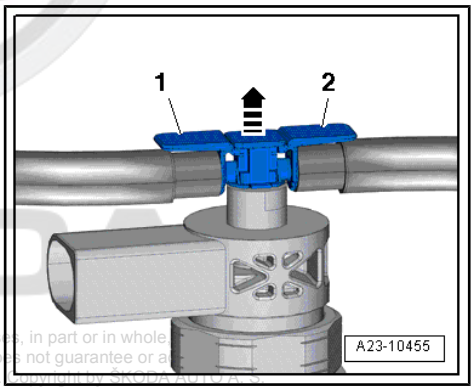
– Before removing, clean all the connections of the fuel return-flow line.

– Dry all the cleaned component parts.

Work procedure (starting at cylinder 1)

– Disconnect the connection of the return line at the injection unit, to do so press down the clamps -1- and -2- and at the same time pull up the unlocking bolt -arrow-.

– Connect the clean, blown through adapter on the injection unit to be tested.



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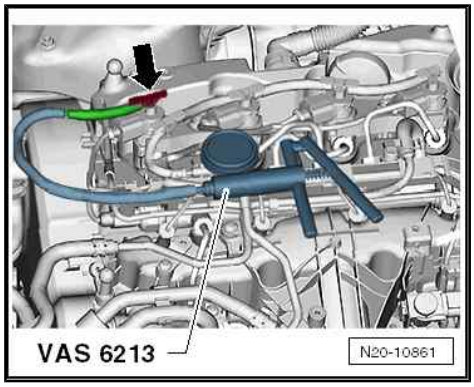
– Use the hand vacuum pump - VAS 6213- to build up a vacuum of -500 mbar.

• If the injection unit is O.K, the pressure remains constant for more than 30 s.

If the injection valves are defective, the pressure drops again to 0 bar within 2-3 seconds.

If necessary, repeat the test and monitor the pressure loss of the hand vacuum pump - VAS 6213- .

– Replace defective injection units
⇒ “2.10 Removing and installing the injection units”, page 284 .



2.8 Check injection unit return quantity with engine running

⇒ “2.8.1 Checking return flow quantity of all injection units”, page 280

⇒ “2.8.2 Check the return line volume of each individual injection unit”, page 281

2.8.1 Checking return flow quantity of all injection units

Note

♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

♦ *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

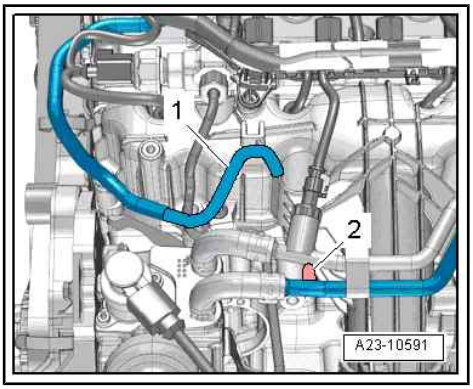
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Detach fuel return-flow line -1-.

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– Close the open fuel return line connection with a clean plug -2-.

– Keep fuel return hose -1- in measuring vessel.



Note

If necessary, extend fuel return hose with a suitable hose.

– Start engine and run for 2 minutes at idling speed.

– Check return flow quantity collected in the measuring container.

• Set value in 2 minutes: 0 ml to 50 ml

If the specified value is reached:

– Increase engine speed to 2000 to 2500 rpm for 2 minutes.

– Check return flow quantity collected in the measuring container.

• Set value in 2 minutes: less than 250 ml

If the specification is exceeded, one or more injection units is defective.

– Check the return flow quantity of each individual injection unit ⇒ “2.8.2 Check the return line volume of each individual injection unit”, page 281 .

2.8.2 Check the return line volume of each individual injection unit

Special tools and workshop equipment required

♦ Hose clamps up to ∅ 25 mm - MP7-602 (3094)-

♦ Return flow quantity measuring device . e.g. -VAS 6684-

Note

♦ *Safety precautions when working on the fuel supply system* ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

♦ *Observe rules for cleanliness* ⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

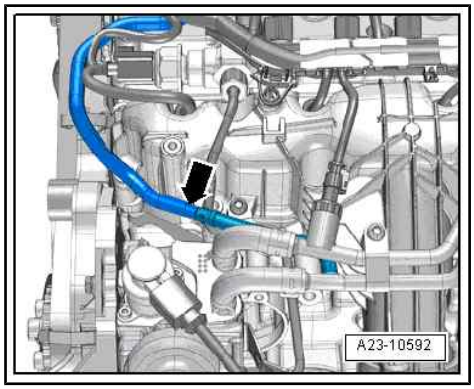
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Each injection unit has a small amount of return. If this return flow quantity is relatively great (in relation to the return flow quantity of the other injection units), this injection unit is probably defective.

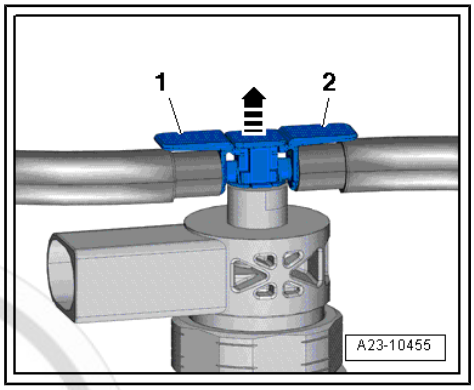
– Before removing, clean all the connections of the return line.

– Dry all the cleaned component parts.

– Close fuel drain hose -arrow- with the hose clamp up to ∅ 25 mm - MP7-602 (3094)- .



– Detach the return-flow line connections at the injection units. To do so, press down the clamps -1- and -2- and at the same time pull up the unlocking bolt -arrow-.



Note

Pay attention to cleanliness, no impurities must get into the open return lines and into the connections of the injection units.

– Firmly fit adapter - C6- to the return line connections of all 4 injection units.

– Connect hose lines of the return flow quantity measuring device e.g. -VAS 6684- to the adapters - C6- .

– Start engine and run in idle for a few minutes.

Caution

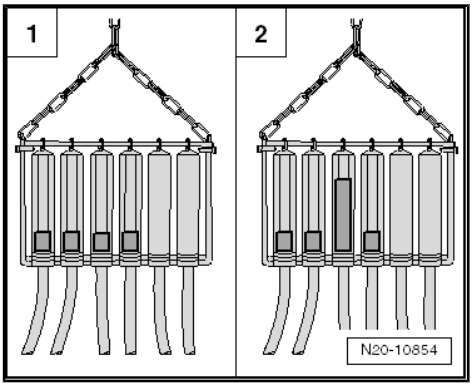
Risk of damage to injection units when return-flow lines are removed.

No acceleration must occur during testing - the engine must run in idle.

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When the engine is at operating temperature, there must be only minimal difference in the return flow quantity from all 4 injection units (example -1-).

If one injection unit has a significantly higher return flow quantity (example -2-), this injection unit must be replaced
⇒ “2.10 Removing and installing the injection units”, page 284 .



Assembly of fuel return-flow lines

Note

All sealing rings are wetted with assembly or engine oil.

– Replace O-rings at all return line connections.
– Carefully press the return lines connections onto the injection units.

Note

The cap must click audibly into place.

– Then carefully press the unlocking bolt downwards.
– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

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2.9 Check injection unit return flow quantity at starter speed

Special tools and workshop equipment required

♦ Return flow quantity measuring device . e.g. -VAS 6684-

If the engine will not start the return flow quantity of the injection units can also be tested at starter speed.

Note

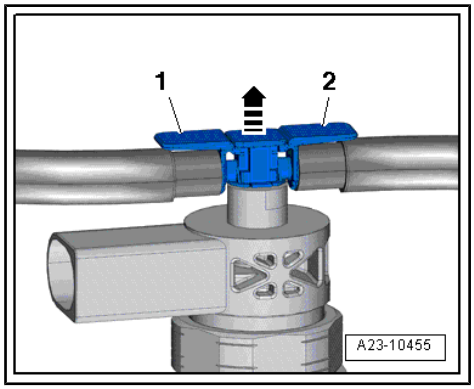
♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

♦ *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

Each injection unit has a small amount of return. If this return flow quantity is relatively great (in relation to the return flow quantity of the other injection units), this injection unit is probably defective.

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .
– Before removing, clean all the connections of the return line.
– Dry all the cleaned component parts.

– Detach the return-flow line connections at the injection units. To do so, press down the clamps -1- and -2- and at the same time pull up the unlocking bolt -arrow-.



Note

Pay attention to cleanliness, no impurities must get into the open return lines and into the connections of the injection units.

– Firmly fit adapter - C6- to the return line connections of all 4 injection units.
– Connect hose lines of the return flow quantity measuring device e.g. -VAS 6684- to the adapters - C6- .
– Press the starter 3 times, pausing 20 seconds between each attempt to start to ensure the starter is warmed up.
• Set value of the return flow quantity: 0 ml

If fuel is leaking from one fuel injection unit, that injection unit must be replaced.

– Connect the plug at the fuel pressure regulating valve - N276- .

Assembly of fuel return-flow lines

Note

All sealing rings are wetted with assembly or engine oil.

– Replace O-rings at all return line connections.
– Carefully press the return lines connections onto the injection units.

Note

The cap must click audibly into place.

– Then carefully press the unlocking bolt downwards.
– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .
– Delete event memory entry with Vehicle diagnosis tester .

2.10 Removing and installing the injection units

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Special tools and workshop equipment required

♦ Extractor - T10055-
♦ Assembly tool - T10377-
♦ Extractor - T10415-
♦ Cleaning set . e.g. -VAS 6811-

Removing

Note

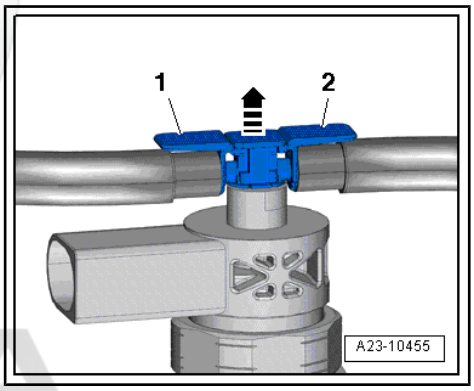
- *Safety precautions when working on the fuel supply system*
  ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness*
  ⇒ *"3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

– Remove engine cover
⇒ "1.1 Removing and installing engine trim panel", page 11 .

Caution

- ***Mark the assignment of the injection units to the cylinders. They must only be re-used on the same cylinder.***
- ***Immediately close the open connections with suitable caps.***

– Detach the return-flow line connections at the injection units. To do so, press down the clamps -1- and -2- and at the same time pull up the unlocking bolt -arrow-.

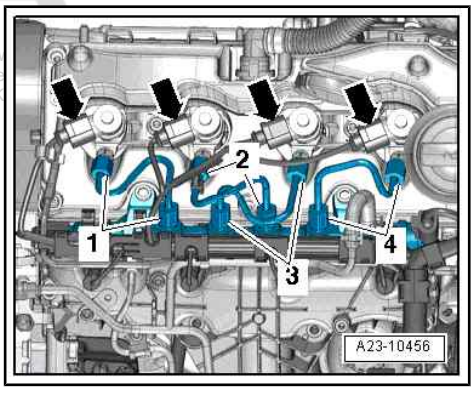


– Disconnect the plug -arrows- at the injection units.

Caution

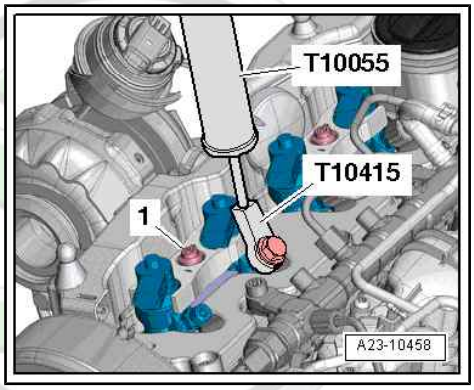
When slackening the union nuts for the high pressure lines, counterhold the connection fitting with a lateral wrench. If the connection fitting loosens, this can cause leakage.

– Unscrew the union nuts of the relevant high pressure line -1-, -2-, -3- or -4- and remove the corresponding high pressure line.



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– Release the screw -1- of the clamping claw for the injection unit to be removed.
– Position the extractor - T10055- with the extractor -T10415- and pull out the injection unit towards the top by tapping it.



Note

- *In order not to damage the sealing lip of the gasket ring in the cylinder head cover, pull out the injection unit with rotary movements.*
- *Place the removed injection units on a clean cloth.*

Important instructions for installing the injection units

When reinstalling the injection unit, the following parts must be replaced:

- Copper seal
- O-ring in the hole for injection unit in the cylinder head
- O-ring for fuel return-flow line

When installing a new injection unit the following parts must be replaced:

- Copper seal
- O-ring in the hole for injection unit in the cylinder head
- O-ring for fuel return-flow line

Instructions for reinstalling the injection units

Note

- *When reinstalling, the removed injection units, the high pressure lines and the clamping claws must only be installed again at the same point.*
- *The reinstalled injection units or high pressure lines must not be damaged.*

– Spray the tip of the injection unit with a rust solvent spray. Remove the soot and grease particles with a cloth after approx. 5 minutes.
– Remove the old copper seal from the injection unit; to do so, carefully tighten the copper seal in a vice until the copper seal does no longer turn. Then pull the injection unit out of the copper seal with slight turning and pulling movements of the hand.
• Check the injection units and the fitting positions for cleanliness before installing.

Mounting sequence

Note

- *All the O-rings must be coated with engine oil before installing.*
- *Carefully check all the parts and the fitting positions for cleanliness before installing.*

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Caution

Risk of damage to injection unit sealing surfaces.

To remove the particles on the sealing surface of the injection unit, clean the injection unit shaft in the cylinder head with cleaning set - VAS 6811- or with a cloth soaked in engine oil.

– Remove soot particles on the sealing surface of the injection unit in the cylinder head and dirt in the opening.

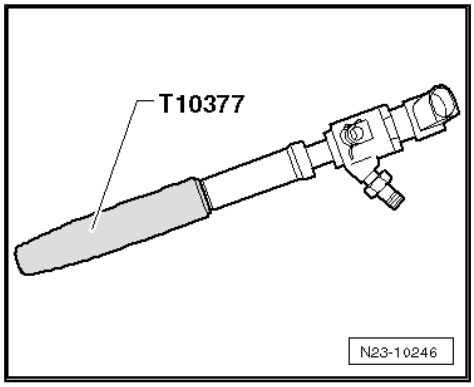
– Insert a new copper seal on the injection unit with plastic bushing.

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– Replace the O-ring for the gasket of the bore for the injection unit head, to do so use the assembly sleeve - T10377- .

– Carefully slide the new and oiled O-ring onto the return connection.



Caution

Pay particular attention in order to avoid unnecessary installation work or consequential damage.

Avoid damage and contact of the injection units with the cylinder head.

– Always insert 2 injection units with clamping claw carefully into the holes of the cylinder head, while doing so observe the fitting position.

– Screw in the new fixing screw of the clamping claw and only slightly tighten to a tightening torque of maximum 1 - 2 Nm.

Note

In order to install the high pressure line free of stress, it must be possible to align the injection unit by turning it slightly.

– Install the high pressure line free of tension, to do so, align the position of the injection unit by turning it slightly. Only tighten the union nuts by hand.

– Tighten the fixing screw of the clamping claw.

– Tighten the union nuts of the high pressure lines.

– Carefully press the connection of the fuel return-flow line via the gasket ring onto the injection unit.

• The cap must click audibly into place.

– Afterwards carefully press the securing bolt downwards.

After replacing one or several injection units, carry out the adaptation according to their codes “injector quantity adjustment IQA” ⇒ Vehicle diagnostic tester.

In addition, check all other “injector quantity adjustment (IQA)” injection units to ensure that all values have been entered correctly. If the correct values are stored in the engine control unit, these values must never be entered again.

– Venting air from the fuel system
⇒ “1.3 Filling/bleeding the fuel system”, page 266 .

Note

The return-flow lines must only be replaced complete with the pressure holding valve ⇒ ETKA - Electronic Catalogue of Original Parts .

– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

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Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Screw for clamping claw
  ⇒ “2.2 Summary of components - injection units”, page 270 .
- Union nuts
  ⇒ “2.2 Summary of components - injection units”, page 270 .

2.11 Installing the high pressure lines

Special tools and workshop equipment required

- Socket wrench insert - T40055-

Caution

- ***Slacken the fuel distributor from the high pressure pump free of stress for improved and stress-free installation of the high pressure line. If necessary, slightly push the fuel distributor.***
- ***Slacken the fuel distributor and the clamping claws of the injection units for improved and stress-free installation of the high pressure lines. If necessary, slightly push the fuel distributor and slightly twist the relevant injection unit.***
- ***The high pressure lines must on no account be bent or installed under tension. Tensions would eventually lead to a fracture of the corresponding high pressure line.***

Note

- *The installation of new high pressure lines is described in the following. If previously installed high pressure lines are re-used, they must not be damaged. Before the installation, they must be carefully checked, the work procedure is otherwise the same.*
- *Moisten the threads of the union nuts and the connection fittings with diesel fuel.*

– Slacken the fixing screws of the fuel distributor in order to push it.

– Loosen the fixing screws of the clamping claws in order to turn the injection units.

– Remove the new high pressure lines from their wrapping. Remove the screw plugs and install the high pressure lines at the connection fittings without placing them down.

Note

First of all, install the high pressure lines between the injection units and the fuel distributor, then install the high pressure line between the high pressure pump and the fuel distributor.

– First tighten the union nuts of the high pressure lines in the prescribed order ⇒ page 290 by hand up to the “stop”. When

doing this, ensure that the pipe cones are correctly seated in the connection fittings.

Note

Tighten the union nuts of the high pressure lines using the socket wrench insert - T40055- .

– Tighten the fixing screws and the union nuts of the high pressure lines according to the prescribed work procedure ⇒ page 290 .

– Carefully press the connection of the fuel return-flow line via the new gasket rings onto the injection unit.

• The cap must click audibly into place.

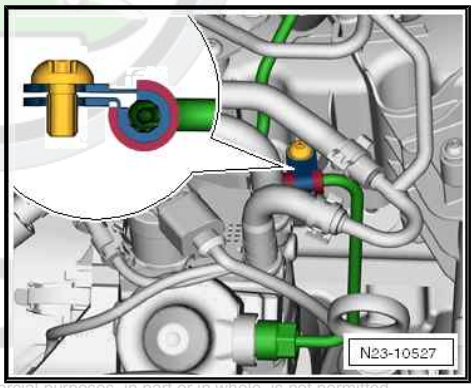
– Press down the securing bolts.

– Check fuel system for tightness ⇒ “2.4 Check the fuel system for tightness”, page 276 .

WARNING

The fixing clamp of high pressure line between the high pressure pump and the fuel distributor must absolutely be installed in the correct position. Otherwise the high pressure line can kink due to vibrations or tension.

Fitting location of the fixing clamp of the high pressure line



– Tighten fixing clamp to 8 Nm.

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Mounting sequence

order of tightening	Tightening torque
1. Screws of clamping claws for injection units	8 Nm + 270°
2.1. Union nuts of the high pressure lines at the connection fittings of the injection units	28 Nm
2.2. Union nuts of the high pressure lines at the connection fittings of the fuel distributor	28 Nm
3.1. Union nuts of the high pressure line at the connection fitting of the high pressure pump	28 Nm
3.2. Union nuts of the high pressure line at the connection fitting of the fuel distributor	28 Nm
4. Fixing screws of the fuel distributor	22 Nm
5. Screws of the clamp for the high pressure line	8 Nm

[1] Tighten union nuts in one work step without time delay between tightening and torquing angle (max. 1 min).

2.12 Removing and installing the fuel distributor

Special tools and workshop equipment required

- Screw plug set for engine - VAS 6122-

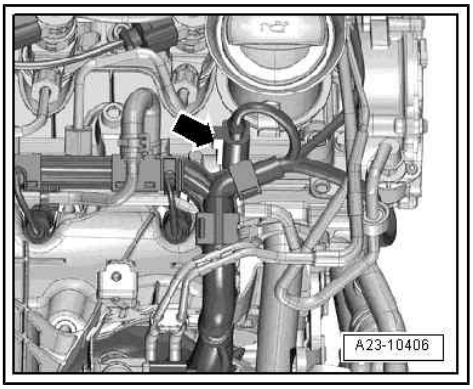
Removing

Note

- *Safety precautions when working on the fuel supply system* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness* ⇒ *"3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

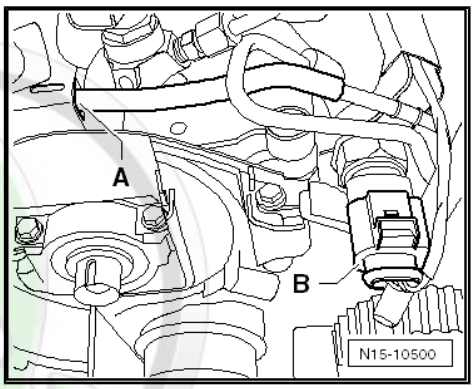
– Remove engine cover ⇒ "1.1 Removing and installing engine trim panel", page 11 .

– Disconnect the plug -arrow- at the fuel pressure regulating valve - N276- .



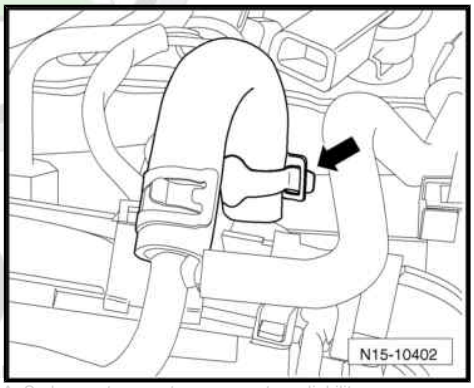
– Disconnect plug -B- at fuel pressure sender - G247- .

– Detach the vacuum hose -A- from the cylinder head cover.



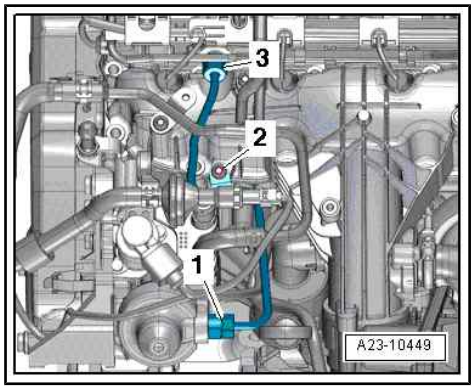
– Remove the fuel return hose from the fuel distributor, to do so slacken the hose clamp -arrow-.

– Disconnect the plugs at the glow plugs ⇒ "1.1 Removing and installing glow plugs", page 360 .



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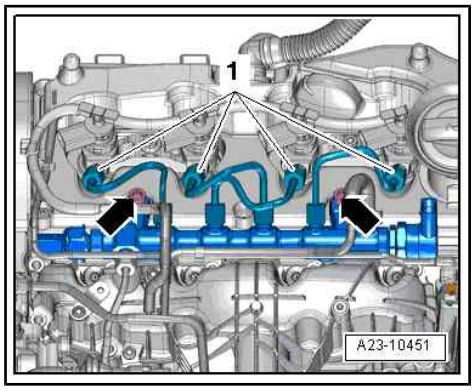
– Unscrew screw -2- and union nuts -1- and -3-.
– Remove high pressure line.
– Remove the cable guide from the fuel distributor and lay it to the side.



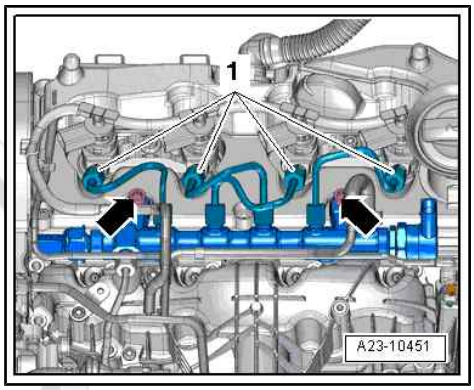
Caution

When slackening the union nuts of the high pressure line, hold the connection fitting with an open-end wrench. If the connection fitting loosens, this can cause leakage.

– Unscrew the union nuts -1- of the high pressure lines from the injection units.



– Release fixing screws -arrows- and remove the fuel distributor.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

– Install high pressure lines free of stress
⇒ “2.11 Installing the high pressure lines”, page 289 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Screw for clamping claw
⇒ “2.2 Summary of components - injection units”, page 270 .
- Union nuts
⇒ “2.2 Summary of components - injection units”, page 270 .

2.13 Removing and installing fuel pressure sender - G247-

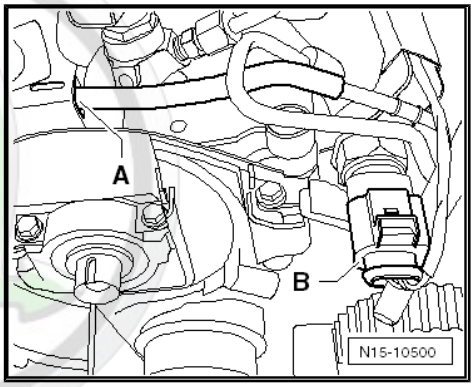
Special tools and workshop equipment required

- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves

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The fuel pressure sender - G247- -B- is located in the fuel distributor. It measures the current fuel pressure in the high pressure system and delivers a voltage signal to the engine control unit - J623- .

If the sender fails, the pressure regulation is controlled by the engine control unit via a characteristic diagram; in case of emergency, the maximum engine speed is limited to approx. 3000 rpm.



Removing

Note

- *Safety precautions when working on the fuel supply system* *⇒ "2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness* *⇒ "3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

– Remove engine cover ⇒ "1.1 Removing and installing engine trim panel", page 11 .

WARNING

Wear protective gloves and protective goggles when working with grease remover!

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Note

No grease remover must get into the plug connection, carefully clean.

– Before removing the fuel pressure sender - G247- , clean the thread area with a grease remover (no dirt must get into the hole of the fuel distributor).
– Dry the fuel pressure sender - G247- .
– Disconnect plug at fuel pressure sender - G247- .

Caution

Do not slacken the fuel pressure sender using the open-end wrench or the open ring spanner - Risk of damage!

Use lengthened socket insert.

– Unscrew the fuel pressure sender - G247- .
– Remove dirt from the threaded hole and the sealing surface at the fuel distributor. To do so do not use any mechanical tools.

Note

Close the fuel distributor hole immediately with a suitable screw plug in order to prevent dirt from penetrating.

Installing

Note

- *The fuel pressure sender - G247- has no gasket ring but a biting edge for sealing.*
- *Pay attention to damage of the biting edge and the thread of the new fuel pressure sender - G247- . It is possible to use the fuel pressure sender - G247- again.*
- *Also check the sealing surface of the hole of the fuel distributor.*

Caution

Do not tighten the fuel pressure sender using the open-end wrench or the open ring spanner - Risk of damage!

Use lengthened socket insert.

– Screw in fuel pressure sender - G247- by hand.
– Tighten the fuel pressure sender - G247- .
– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

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Tightening torques - summaries of components

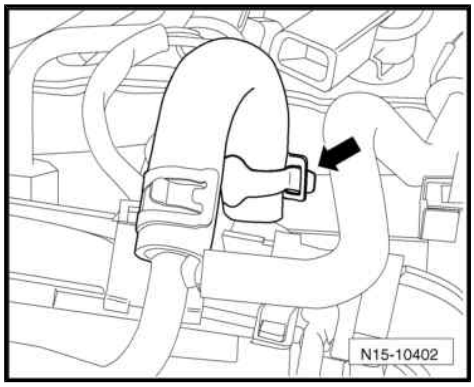
- Fuel pressure sender - G247-
⇒ “2.2 Summary of components - injection units”, page 270 .

2.14 Check fuel pressure regulating valve - N276-

Note

- *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

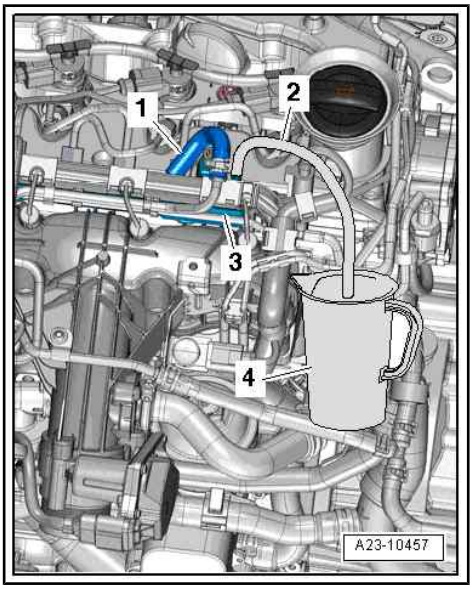
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .
– Remove the fuel return hose from the fuel distributor, to do so slacken the hose clamp -arrow-.
– Close the detached fuel return flow hose with a suitable plug.



– Connect the auxiliary hose -2- to the return-flow connection at the fuel distributor -3-.
– Hold the auxiliary hose in a measuring vessel -4- in order to measure the return flow quantity.
– Start engine and run for 30 seconds at idling speed.
• Specified value: 90 ... 110 ml

If the specified value is not reached, the fuel pressure regulating valve - N276- is defective.

– Replace fuel pressure regulating valve - N276-
⇒ “2.15 Replace fuel pressure regulating valve N276 ”, page 295 .

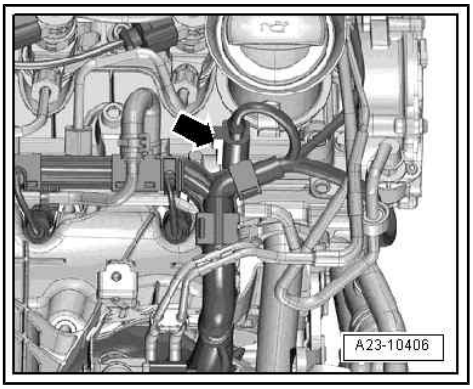


2.15 Replace fuel pressure regulating valve - N276-

The fuel pressure regulating valve - N276- -arrow- is installed in the fuel distributor and provides a constant pressure in the high pressure fuel circuit.

If the pressure in the high-pressure fuel circuit is too high, the regulating valve opens and some of the fuel from the fuel distributor flows back into the fuel tank via the fuel return-flow line.

The pressure control valve closes if there is too low a pressure in the high-pressure fuel circuit and thus seals the high-pressure side from the low-pressure side.



Note

The fuel pressure regulating valve - N276- is not reusable.

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Special tools and workshop equipment required

♦ Cleaning and degreasing agent , e.g. -D 009 401 04-
♦ Protective goggles and gloves

Removing

Note

♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
♦ *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Remove fuel distributor
⇒ “2.12 Removing and installing the fuel distributor”, page 291 .

WARNING

Wear protective gloves and protective goggles when working with grease remover!

Note

No grease remover must get into the plug connection, carefully clean.

- Also clean the thread area of the fuel pressure regulating valve - N276- with a grease remover - no dirt must get into the hole of the fuel distributor.
- Dry fuel pressure regulating valve - N276- .
- Counterhold the fuel pressure regulating valve - N276- on the hexagon and slacken the screwed connection using a wrench.
- Unscrew the screwed connection by hand and remove the fuel pressure regulating valve - N276- from the fuel distributor.
- Remove dirt from the thread, the sealing surface and the hole in the fuel distributor. To do so do not use any mechanical tools.

Note

Close the fuel distributor hole immediately with a suitable screw plug in order to prevent dirt from penetrating.

Installing

Note

- *The fuel pressure regulating valve - N276- does not have a gasket ring but a biting edge.*
- *The fuel pressure regulating valve - N276- is not reusable.*
- *The O-ring seals the high-pressure side from the low-pressure side and must be replaced.*
- *Before installing, moisten the O-ring and the hole in the fuel distributor with diesel fuel.*
- *Pay attention to damage of the biting edge and the thread of the new fuel pressure regulating valve - N276- .*
- *Also check the sealing surface at the fuel distributor.*

- Screw in the screwed connection and tighten by hand.
- Align the fuel pressure regulating valve - N276- in such a way that the connecting line is routed tension-free after fitting on the plug.
- Counterhold the fuel pressure regulating valve - N276- on the hexagon and tighten the screwed connection using a wrench.
- Install fuel distributor
⇒ “2.12 Removing and installing the fuel distributor”, page 291 .

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After installing the engine, let the engine run at an average speed for a few minutes and then switch it off.

– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

Tightening torques - summaries of components

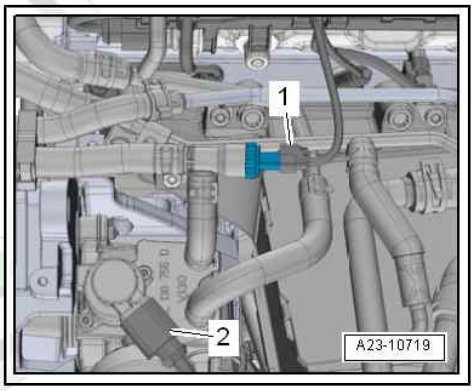
♦ Fuel pressure regulating valve - N276-
⇒ “2.2 Summary of components - injection units”, page 270 .

2.16 Removing and installing fuel temperature transmitter - G81-

Removing

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Disconnect plug connection -1-.



WARNING

Fuel feed line is pressurised. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

– Unscrew fuel temperature sender - G81- .

– Collect the fuel which flows out with a cloth.

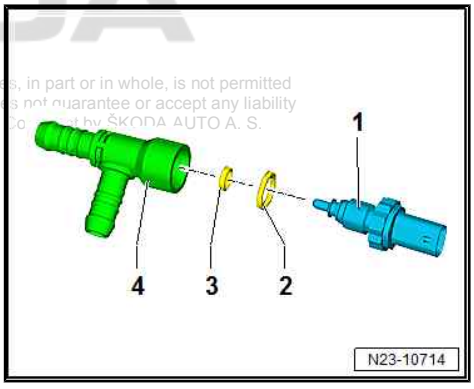
Installing

Installation is performed in the reverse order, pay attention to the following points:

– Replace the gasket ring -3-.

– Check the correct fit of the seal ring -2-.

– Screw fuel temperature sender - G81- into the adapter -4-.



– Check fuel system for tightness
⇒ “2.4 Check the fuel system for tightness”, page 276 .

– Install the engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

Component	Tightening torque
Fuel temperature sender - G81-	2 Nm

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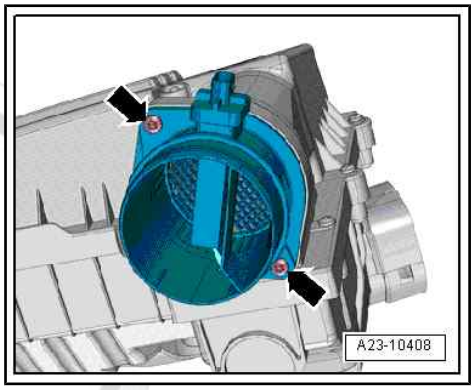
2.17 Removing and installing air flow mass meter - G70-

Removing

– Remove air filter top part
⇒ “3.6 Removing and installing air filter”, page 309 .

– Remove screws -arrows-.

– Carefully remove the air mass meter - G70- from the top of the air filter.



Installing

The following work instructions must be performed to ensure perfect functioning of the air mass meter - G70- :

Note

- *If the air filter is heavily soiled or soaked, dirt particles or moisture can enter the air mass meter - G70- and distort the measured air flow values. This results in a reduction of output, because a lower fuel injection quantity is calculated.*
- *Use original air filter element ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *Always replace any damaged gasket rings (unmetered air).*
- *Use a silicone-free lubricant for installing the air guide hose and gasket ring.*
- *The hose upport and the air guide hose must be de-oiled and degreased before installing.*
- *Secure hose connections with original hose clamps ⇒ ETKA - Electronic Catalogue of Original Parts .*

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– Check air mass meter - G70- as well as air guide hose (on the side of the fresh air) for salt residues, dirt and leaves.

– Check suction channel up to air filter insert for dirt.

If contamination is detected:

– Free air filter upper and lower air filter parts of salt residue, dirt or leaves. Clean by washing out or vacuuming if required.

– Install upper air filter part
⇒ “3.6 Removing and installing air filter”, page 309 .

Tightening torques - summaries of components

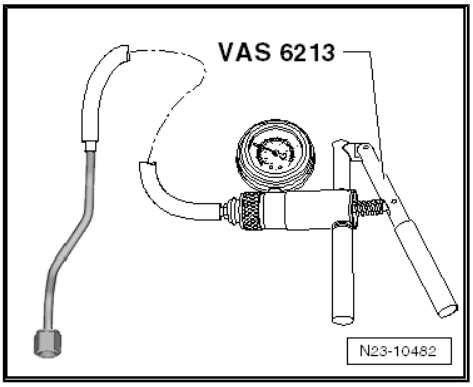
- Air mass meter - G70-
⇒ “3.2 Summary of components - air filter”, page 303 .

2.18 Testing the pressure of the high pressure pump

Special tools and workshop equipment required

- Hand vacuum pump , e.g. -VAS 6213-

♦ Make an -adapter- out of the high pressure line.



Test condition

- The tests on the low-pressure side of the fuel line were carried out and no complaints arose.
- The return flow quantity on the high pressure pump was checked and no complaints arose.
- The fuel tank is filled with clean fuel according to the valid standards.
- The starter is operated at a starter speed of ≥ 230 rpm.

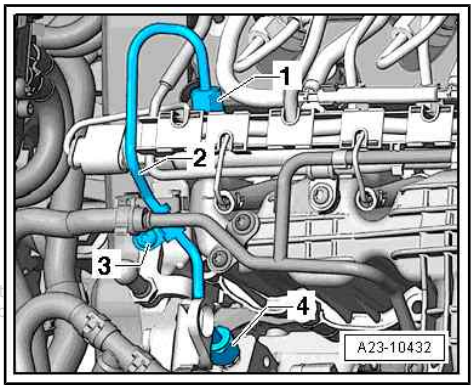
Work procedure

Note

♦ *Safety precautions when working on the fuel supply system*
⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .

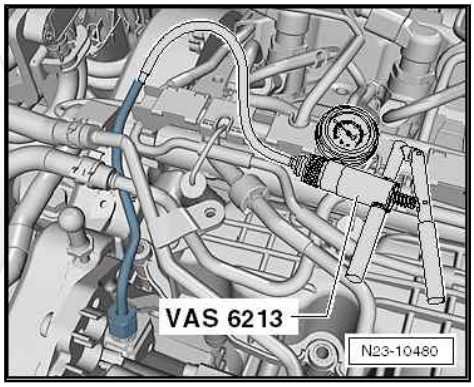
♦ *Observe rules for cleanliness*
⇒ *"3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6* .

– Remove the fuel high pressure line -2- between the high pressure pump and the fuel distributor Pos. 11
⇒ "2.1 Summary of components - high pressure pump", page 268 .



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– Connect the prepared, well cleaned adapter to the high pressure connection piece of the high pressure pump to 20 Nm.
– Connect the hand vacuum pump - VAS 6213- with the prepared adapter.
– Using the hand vacuum pump - VAS 6213- , generate a pressure of min. 1 bar.



If the high pressure pump is O.K, the pressure remains constant for more than 30 s.

If a high pressure pump is defective, the pressure drops again to 0 bar within 2-3 seconds.

If necessary repeat the test, pay attention to the pressure loss on the hand vacuum pump - VAS 6213- .

– Replace high pressure pump
⇒ “2.3 Removing and installing the high pressure pump”, page 273 .

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3 Intake manifold, air filter

⇒ “3.1 Summary of components - intake manifold”, page 301

⇒ “3.2 Summary of components - air filter”, page 303

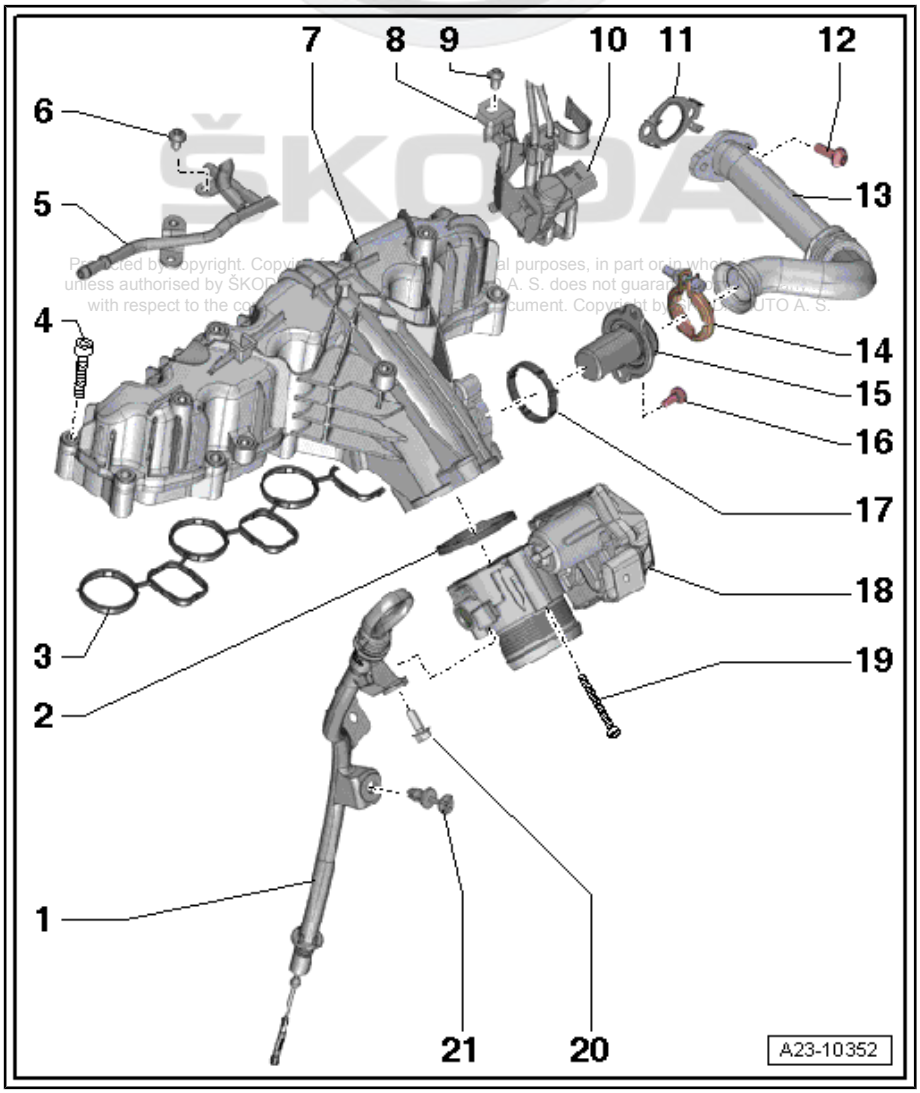
⇒ “3.3 Removing and installing the throttle valve control unit J338 ”, page 304

⇒ “3.4 Cleaning throttle valve control unit J338 ”, page 305

⇒ “3.5 Removing and installing intake manifold”, page 307

⇒ “3.6 Removing and installing air filter”, page 309

3.1 Summary of components - intake manifold



1 - Dipstick
- ❑ with guide pipe

2 - Sealing ring
- ❑ Replace after disassembly

3 - Seal
- ❑ Replace after disassembly

4 - Screw
- ❑ 8 Nm

5 - Fuel return-flow line

6 - Screw
- ❑ 9 Nm

7 - Intake manifold
- ❑ Removing and installing ⇒ “3.5 Removing and installing intake manifold”, page 307

8 - Mounting bracket
- ❑ Change-over valve for radiator of exhaust gas recirculation - N345-

9 - Screw
- ❑ 9 Nm

10 - Changeover valve for radiator of exhaust gas recirculation - N345-

11 - Seal
- ❑ Replace after disassembly

12 - Screw
- ❑ 9 Nm

13 - Connecting pipe
- ❑ to radiator for exhaust gas recirculation

Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

14 - Fixing clamp

- ❑ Replace after disassembly
- ❑ 5 Nm

15 - Supports

- ❑ for exhaust gas recirculation

16 - Screw

- ❑ 8 Nm

17 - Sealing ring

- ❑ Replace after disassembly

18 - Throttle valve control unit - J338-

- ❑ clean ⇒ “3.4 Cleaning throttle valve control unit J338 ”, page 305
- ❑ Removing and installing ⇒ “3.3 Removing and installing the throttle valve control unit J338 ”, page 304

19 - Screw

- ❑ 8 Nm

20 - Screw

- ❑ 10 Nm

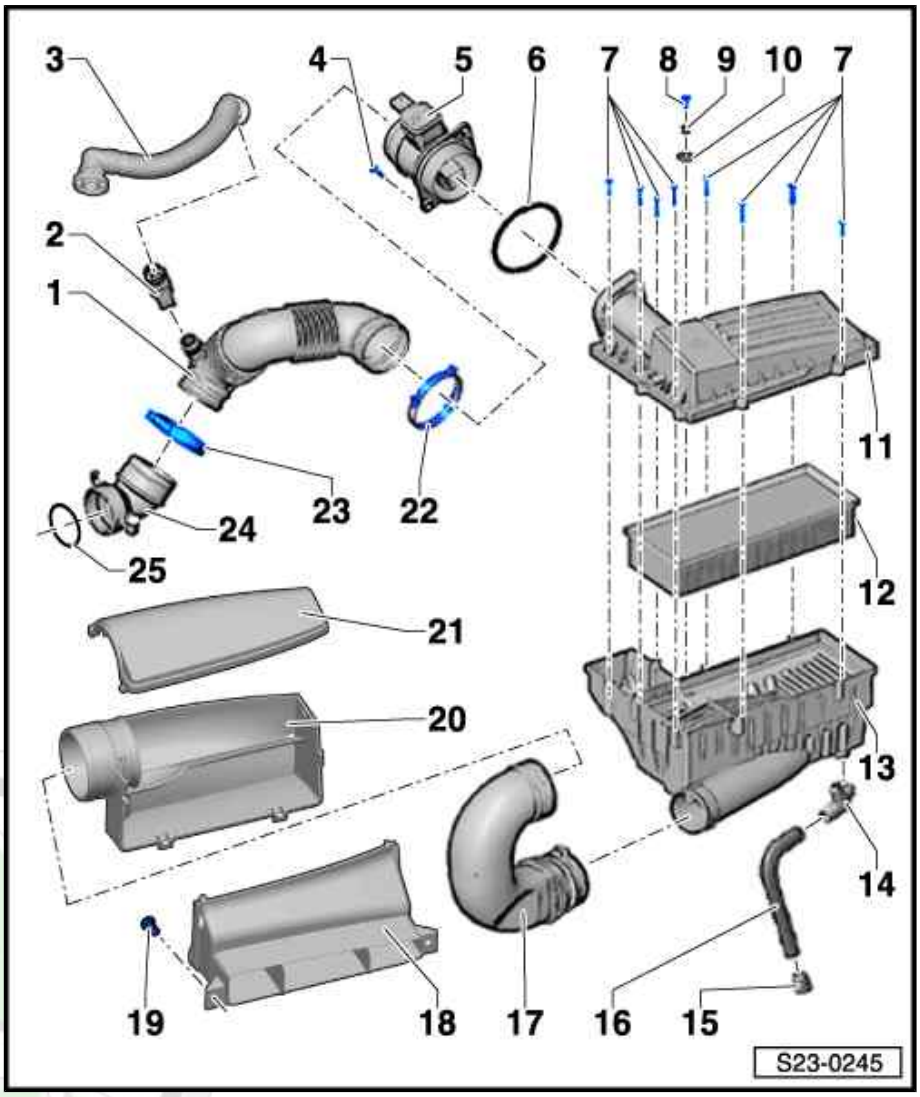
21 - Retaining clip

- ❑ for oil dipstick guide pipe

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3.2 Summary of components - air filter

Removing and installing air filter
⇒ “3.6 Removing and installing air filter”, page 309 .



1 - intake hose
- ❑ to exhaust gas turbo-charger

2 - Vent pipe connection piece
- ❑ With heating
- ❑ Only vehicles for cold climates

3 - Connecting pipe
- ❑ for crankcase ventilation
- ❑ to remove, press release buttons

4 - Screw
- ❑ 2 Nm

5 - Air mass meter - G70-
- ❑ Removing and installing ⇒ “2.17 Removing and installing air flow mass meter G70 ”, page 298

6 - O-ring
- ❑ replace if damaged

7 - Screw
- ❑ 2 Nm

8 - Screw
- ❑ Fixing screw for air filter (air filter lower part)
- ❑ 8 Nm

9 - Bushing

10 - Surface

11 - Air filter top part

12 - Air filter element
- ❑ Pay attention to change intervals:

♦ ⇒ Maintenance ; Booklet Octavia II

♦ ⇒ Maintenance ; Booklet Superb II

♦ ⇒ Maintenance ; Booklet Yeti

13 - Air filter bottom part

14 - Connection piece
- ❑ For drainage pipe

15 - Overrun valve

16 - Hose
- ❑ For water drainage

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17 - Connecting hose

18 - Inlet connection

- ❑ screwed onto lock carrier
- ❑ with pinhole on engines BS-4 (»monsoon hole«)

19 - Screw

- ❑ 2 Nm

20 - Intake air duct

21 - Cap

- ❑ For intake air duct

22 - Spring clip

23 - Spring clip

24 - Inlet connection

- ❑ Observe fitting position to exhaust gas turbocharger
- ❑ with fixing screw, 9 Nm

25 - O-ring

- ❑ Replace after disassembly

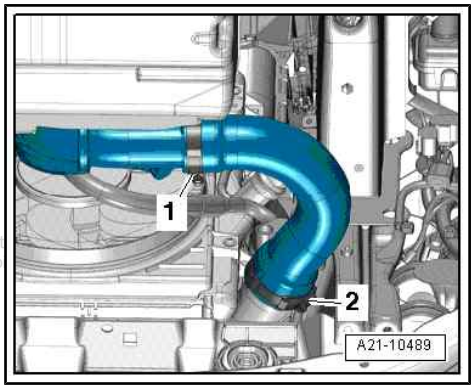
3.3 Removing and installing the throttle valve control unit - J338-

Removing

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

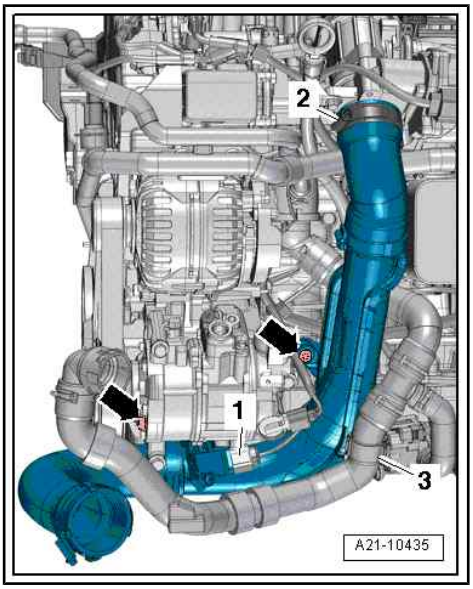
– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Remove the charge air hose, to do so slacken the screw clamps -1- and -2-.

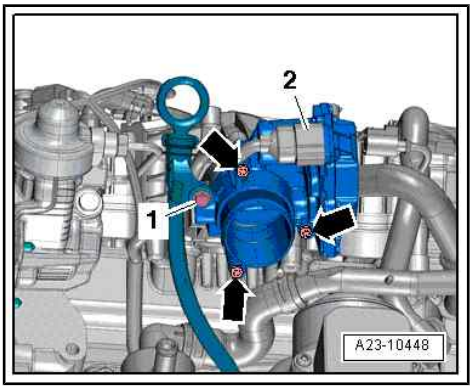


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– Remove screws -arrows-.
– Detach coolant hose -3-.
– Loosen hose clamp -2-.
– Disconnect the plug -1- at the charge pressure sender - G31- with intake air temperature sender - G42- and remove the right charge air pipe.



– Disconnect the plug -2- from the throttle valve control unit - J338- .
– Release screw -1- of guide pipe for oil dipstick.
– Release screws -arrows- and remove throttle valve control unit - J338- .



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Renew O-ring.

Tightening torques - summaries of components

- Screws for throttle valve control unit - J338- ⇒ “3.1 Summary of components - intake manifold”, page 301 .

3.4 Cleaning throttle valve control unit - J338-

Special tools and workshop equipment required

- Commercially available Acetone
- Protective goggles and gloves
- Ultrasonic cleaning device - VAS 6418-
- Cleaning agent - D 600 200 A2- ⇒ ETKA - Electronic Catalogue of Original Parts

Work procedure

– Remove the throttle valve control unit - J338- ⇒ “3.3 Removing and installing the throttle valve control unit J338 ”, page 304 .

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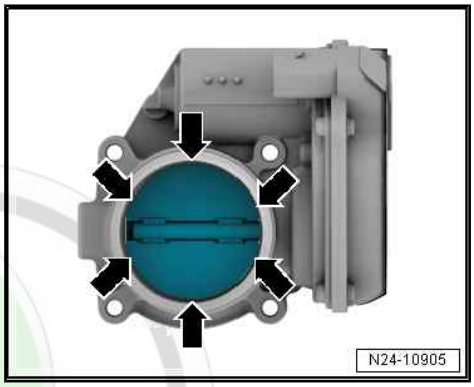
WARNING

Risk of injury due to the acetone action. Acetone is highly flammable and can cause eye and skin irritation.

- *Wear safety goggles.*
- *Wear protective gloves.*

– Clean hrottle body provisionally with commercial acetone and a plastic brush, especially in the throttle valve -arrows-.

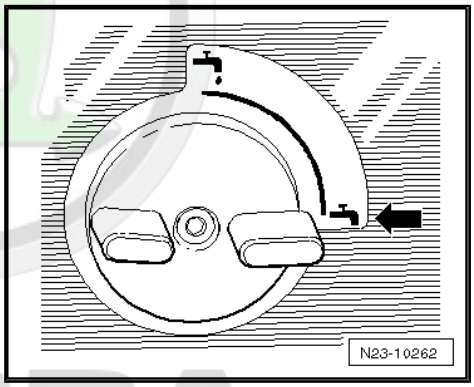
• The throttle valve housing must not be scratched during cleaning!



Clean the Throttle valve control unit - J338- With Ultrasonic cleaner - VAS 6418-

– Close the drain cock -arrow- of the ultrasonic cleaning device - VAS 6418- on the right side of the housing.

– Fill the Ultrasonic cleaner - VAS 6418- with about 1800 ml of hot tap water and 200 ml cleaning agent - D 600 200 A2- .

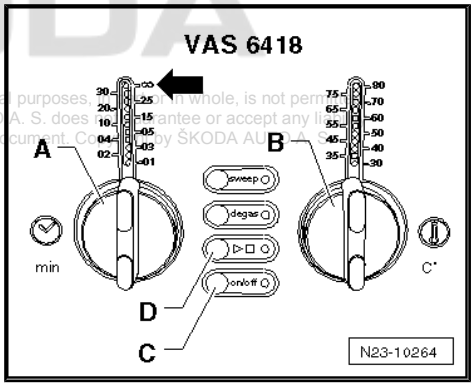


– Turn on the cleaning device by pressing the on / off button -C-.

– Turn temperature rotary switch -B- so that the light indicator is at the heating temperature of 60°C.

– Set the rotary switch for operating time -A- on -Arrows- (continuous operation).

– Press ▶ -D- and thus put the device into operation.



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– Immerse the Throttle valve control unit - J338- -1- so that the cleaning fluid covers only the throttle valve and secure it with workshop materials.

• The electronics must never come into contact with cleaning fluid.

– After reaching the Ultrasonic cleaning device - VAS 6418- temperature of 60°C for about 30 minutes, ensure continuous ultrasonic cleaning of the throttle valve control unit.

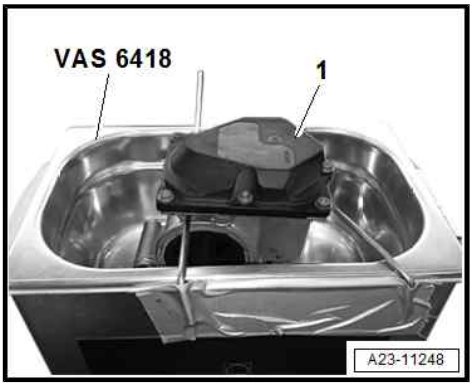
– Remove the remaining softened deposits with a brush or a cloth.

– There must be no moisture in the plug, blow out with compressed air, if required.

– Before installing the Throttle valve control unit - J338- , carry out its electrical test by attaching the plug to the throttle valve control unit.

– Start the engine briefly and switch off immediately. If the throttle closes after opening the engine and opens again, then the throttle valve control unit is working properly.

– If the throttle valve control unit is OK, then install it
⇒ “3.3 Removing and installing the throttle valve control unit J338 ”, page 304 .



3.5 Removing and installing intake manifold

Special tools and workshop equipment required

♦ Socket insert T30 with spherical head - T10405-

Removing

Note

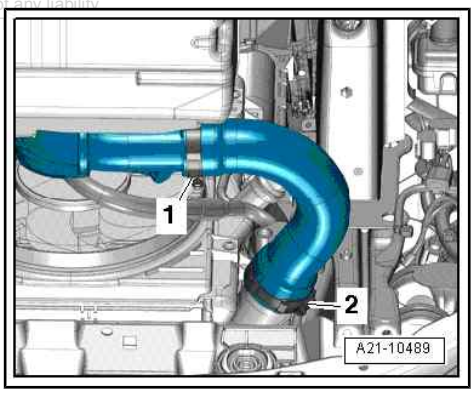
♦ *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

♦ *Observe rules for cleanliness*
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

– Remove the charge air hose, to do so slacken the screw clamps -1- and -2-.

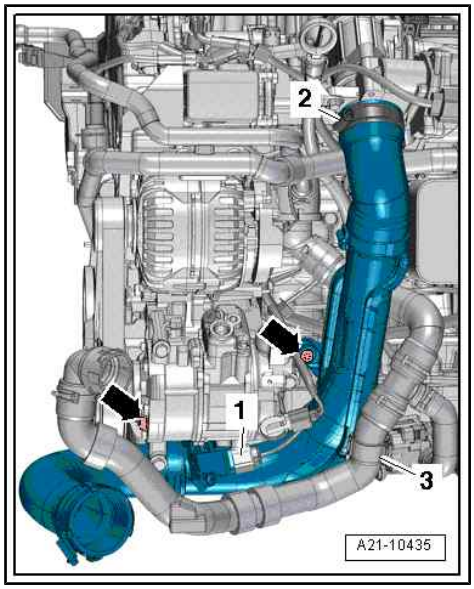


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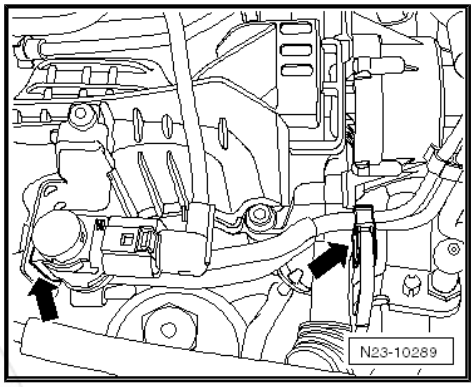
– Remove screws -arrows-.

– Slacken the hose clamp -2- at the throttle valve control unit - J338- , detach the right charge air pipe and leave it in the fitting position.

– Disconnect the plugs at the glow plugs
⇒ “1.1 Removing and installing glow plugs”, page 360 .

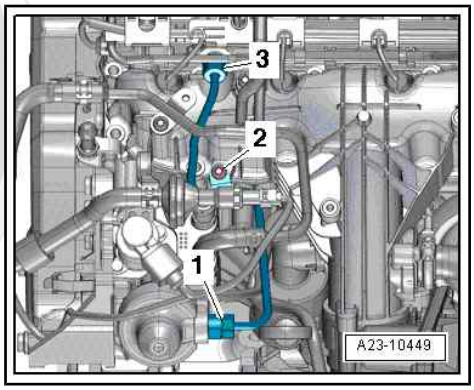


– Take the changeover valve for radiator of exhaust gas recirculation - N345- -left arrow- out of the bracket and place it to the side.



– Release screw -2- and union nuts -1- and -3- for the high pressure line and remove the high pressure line.

– Remove fuel distributor
⇒ “2.12 Removing and installing the fuel distributor”, page 291 .

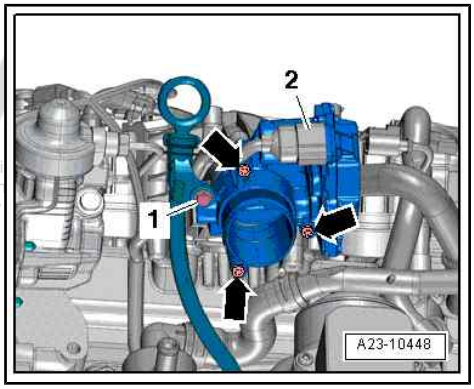


– Disconnect the plug -2- from the throttle valve control unit - J338- .

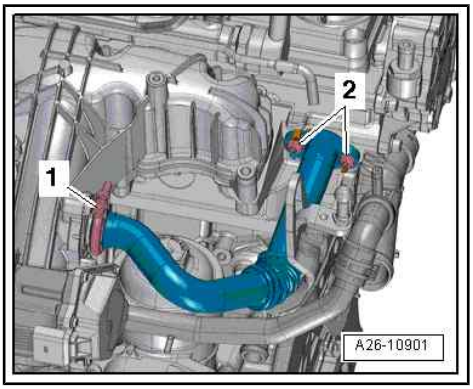
– Release screw -1- of guide pipe for oil dipstick.

– If present, remove support between throttle valve module and cylinder block.

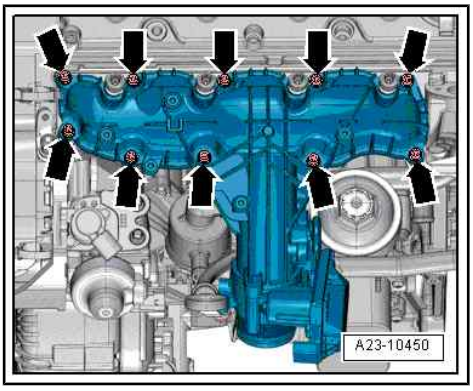
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– Open clamp -1- and remove.



– Release the screws -arrows- for the intake manifold using the socket insert T30 with spherical head - T10405- from outside to inside and crosswise.



– Carefully remove the intake manifold.

Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

Replace gasket.

– Tighten the fixing screws of the intake manifold crosswise from inside to outside.

Tightening torques - summaries of components

♦ Screws for the intake manifold
⇒ “3.1 Summary of components - intake manifold”, page 301

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3.6 Removing and installing air filter

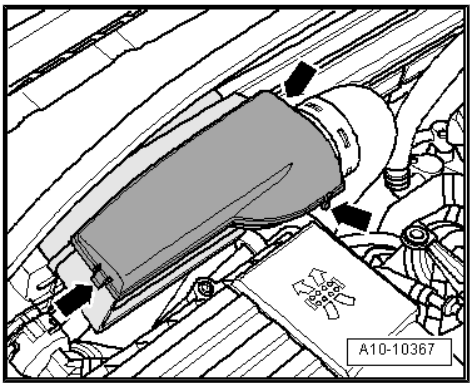
Special tools and workshop equipment required

♦ Pliers for spring-type clips

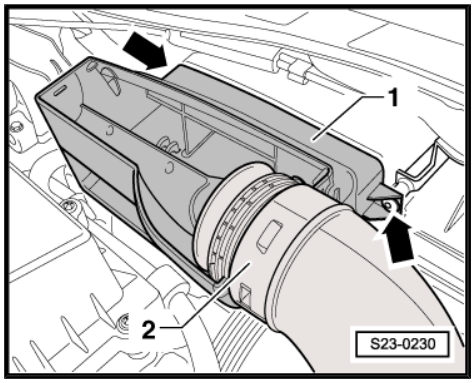
Removing

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

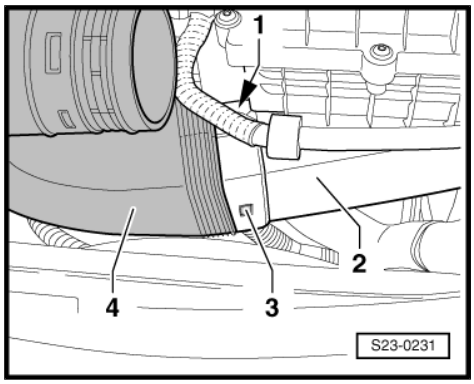
– Remove cover for intake air duct, to do so release lateral holding tabs -arrows-.



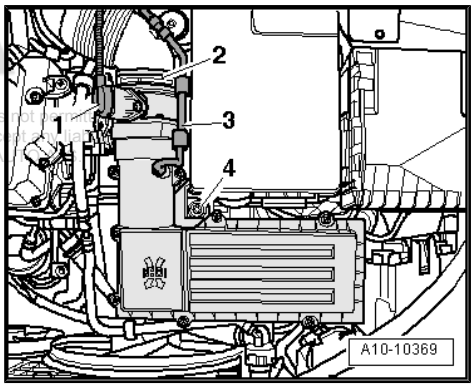
– Release screws -arrows- for connection fitting -1- and take connecting hose -2- out of the guide.



– Press in catches -1- and -3- and pull off connecting hose -4- from air filter -2-.



– Unplug connector -1- from air mass meter - G70- .
– Detach vacuum hose -3- and intake hose -2-.
– Release screw -4- and remove air filter with air mass meter - G70- .



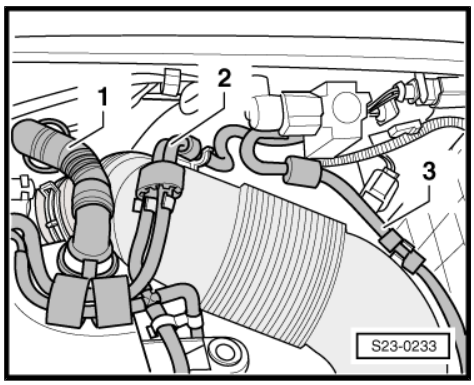
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Remove intake hose

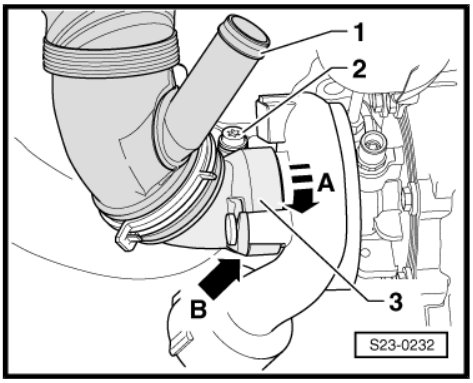
Note

Due to the poor access of the pliers for spring strap clamps to the bottom intake hose it is preferable to remove the inlet connection from the exhaust gas turbocharger.

– Unclip vacuum lines -2- and -3- from intake hose.
– Remove connecting pipe for crankcase ventilation -1-.



– Fully release screw of inlet connection -2-.
– Swivel the inlet connection -3- in the direction of the arrow -A- and remove it with the intake hose -1-.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Renew O-ring.*
- *When installing the inlet connection -3- on the exhaust gas turbocharger, make sure that the inlet connection is correctly seated on the bolt arrow -B-.*

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4 Engine control unit

⇒ “4.1 Removing and installing engine control unit”, page 312

4.1 Removing and installing engine control unit

⇒ “4.1.1 Removing and installing engine control unit (Octavia II)”, page 312

⇒ “4.1.2 Removing and installing engine control unit (Superb II, Yeti)”, page 313

Note

- *If the engine control unit should be replaced, connect vehicle diagnosis, measurement and information system - VAS- and in the guided fault detection system carry out “replace engine control unit”.*
- *After replacing the engine control unit, the “IQA codes” for all the injection units must be written into the new engine control unit.*

Special tools and workshop equipment required

- Body saw e.g. -V.A.G 1523 A-

4.1.1 Removing and installing engine control unit (Octavia II)

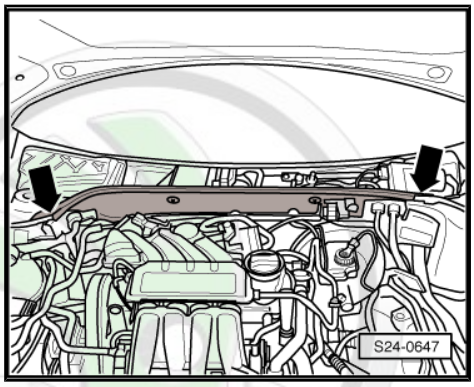
Removing

– Switch off ignition.

– Remove plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

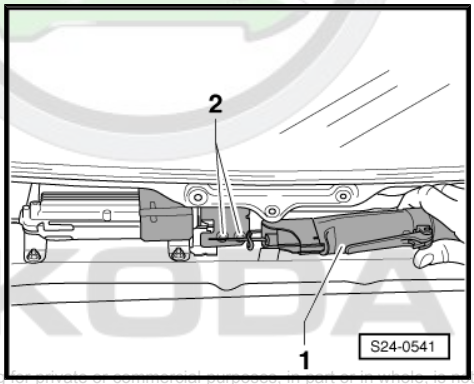
– Remove bulkhead plenum chamber -arrows-.

– Removing windscreen wiper and washer system ⇒ Electrical System; Rep. gr. 92 .



For vehicles with protective housing

– Cut with body saw -1- a slot for the cross-head screwdriver in the heads of the pull-off screws -2-.



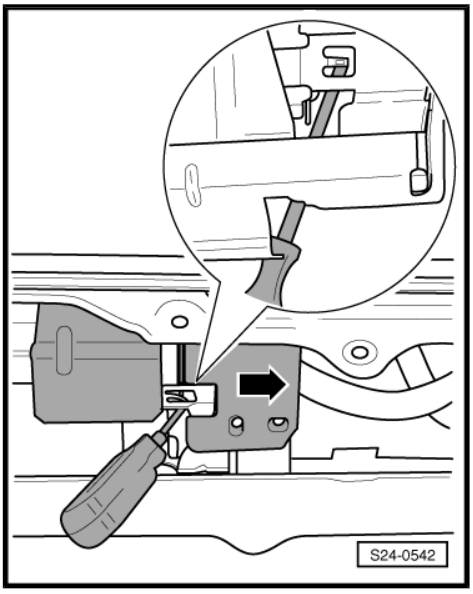
Note

- *It must be sawed twice with the body saw, so that the slot is wide enough, in order to be able to unscrew the screws with a suitable screwdriver.*
- *The pull-off screws until are inserted with locking agent.*

– Unscrew screws -2-.

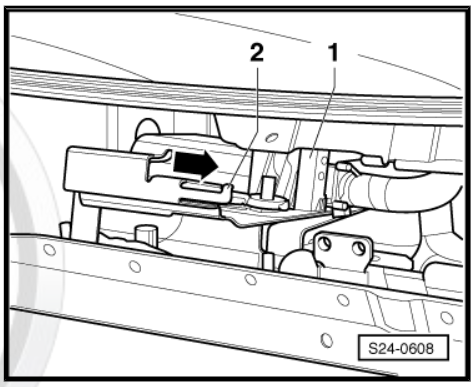
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– Lift locking tab of protective cover with a cross-head screwdriver.
– Push the protective cover in the -direction of the arrow- out of the bracket for engine control unit.



Continued for all vehicles

– Disconnect front plug -1- and remove from engine control unit.
– Lever off retaining bracket -2- slightly.
– Push engine control unit out of the bracket -arrow-.
– Disconnect rear plug and remove from engine control unit.



Installing

Note

For vehicles with protective cover, the metal swarfs must be suctioned out of the plenum chamber before installing the engine control unit.

– Connect rear plug to engine control unit and lock.
– Push engine control unit into the bracket and lock the retaining bracket -2-.
– Connect front plug to engine control unit and lock.

For vehicles with protective housing

– Fasten protective cover with new pull-off screws (before tightening align the protective cover in such a way that it does not come into contact with the surrounding components)

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Continued for all vehicles

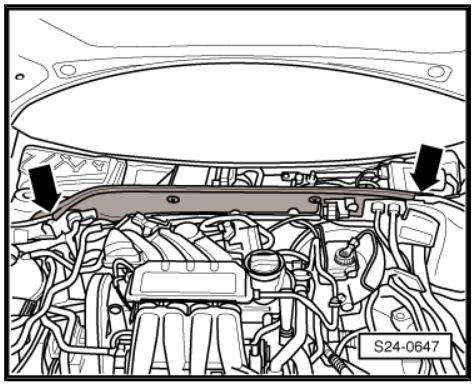
– Installing windscreen wiper and washer system ⇒ Electrical System; Rep. gr. 92 .
– Install bulkhead plenum chamber and plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

4.1.2 Removing and installing engine control unit (Superb II, Yeti)

– Switch off ignition.
– Remove plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

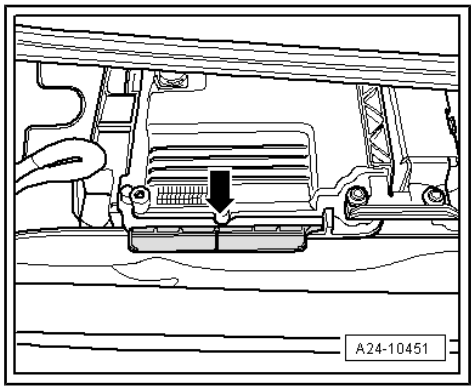
Yeti vehicles

– Remove bulkhead plenum chamber -arrows-.



Continued for all vehicles

– Open retaining clip -arrow- and remove the engine control unit - J623- .

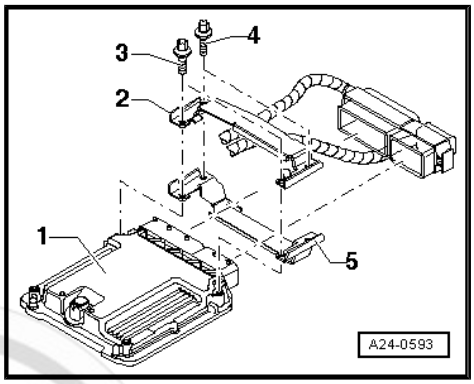


Vehicles with protective cover

– Cut with body saw a slot for the cross-head screwdriver in the heads of the pull-off screws -3- and -4-.

Note

- *It must be sawed twice with the body saw, so that the slot is wide enough, in order to unscrew the screws with a suitable screwdriver.*
- *The pull-off screws until are inserted with locking agent.*



– Unscrew the screws and remove the protective covers -2- and -5- for the plug connections.

Continued for all vehicles

– Unlock both plug connectors at engine control unit and remove them.

Installing

Note

For vehicles with protective cover, the metal swarfs must be suctioned out of the plenum chamber before installing the engine control unit.

– Connect both plugs and lock.

Vehicles with protective cover

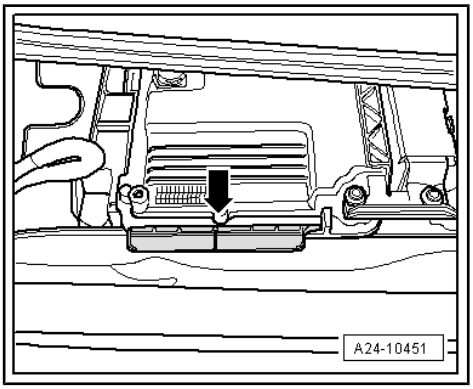
– Fasten protective covers with new pull-off screws.

– Tighten pull-off screws evenly until the heads are pulled off.

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Continued for all vehicles

– Push engine control unit into the bracket and lock with retaining clip -arrow-.



Yeti vehicles

– Install the bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .

Continued for all vehicles

– Install the plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

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26 – Exhaust system

1 Removing and installing parts of the exhaust system

⇒ “1.1 Summary of components - pre-exhaust pipe”, page 316

⇒ “1.2 Summary of components - Middle and rear part of the exhaust system”, page 320

⇒ “1.3 Summary of components - exhaust temperature regulation”, page 324

⇒ “1.4 Removing and installing differential pressure transmitter G505 ”, page 326

⇒ “1.5 Removing and installing pre-exhaust pipe with particle filter”, page 327

⇒ “1.6 Removing and installing pre-exhaust pipe with catalytic converter”, page 331

⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335

⇒ “1.8 Align exhaust system free of stress”, page 336

⇒ “1.9 Inspecting the exhaust system for leaks”, page 339

1.1 Summary of components - pre-exhaust pipe

⇒ “1.1.1 Summary of components - pre-exhaust pipe with particle filter”, page 316

⇒ “1.1.2 Summary of components - Pre-exhaust pipe with catalytic converter”, page 319

1.1.1 Summary of components - pre-exhaust pipe with particle filter

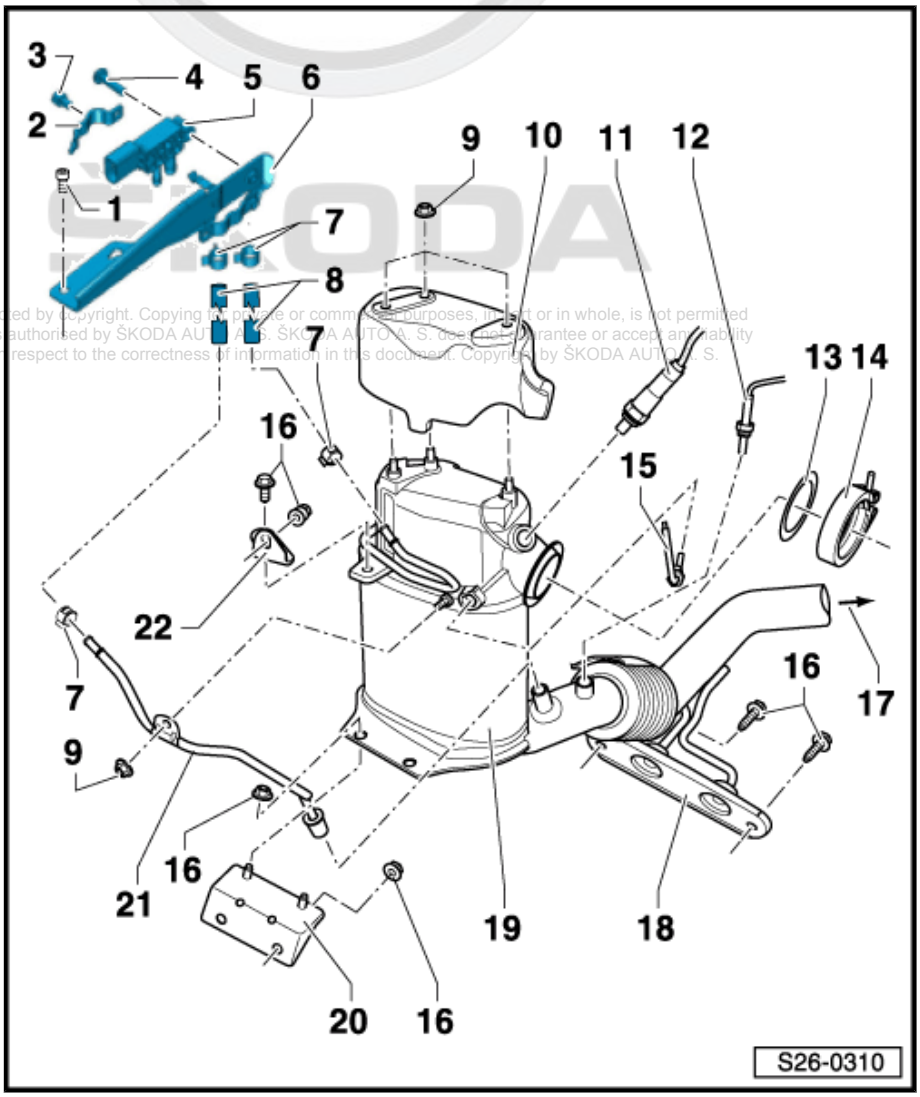
Note

- *The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.*
- *Secure the decoupling element with the transport lock - T10404- to prevent over-tensioning.*
- *Replace the gaskets and the self-locking nuts.*
- *When performing installation work on the exhaust system, make sure the exhaust system is not mounted under tension and has adequate clearance from the vehicle body. If necessary, slacken the clamping sleeve and align the exhaust system so as to create all round adequate clearance to the body and so that the weight is evenly distributed over the hangers.*

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WARNING

The threads of the exhaust gas temperature sender - G495- and -G648- are coated. They MUST NOT be greased additionally with hot bolt paste and must be tightened to the tightening torque stated in the table below. Otherwise the screwed connection can slacken and this could result in a failure.



1 - Screw

- ❑ 8 Nm

2 - Mounting bracket

- ❑ for hoses

3 - Screw

- ❑ 5 Nm

4 - Screw

- ❑ 8 Nm

5 - Differential pressure transmitter - G505-

Caution

Risk of damage!
The differential pressure sender - G505- is very sensitive and therefore requires the utmost care. It must not touch somewhere when laying it down.

Only detach the hoses from the differential pressure sender - G505- if it must be replaced.

- ❑ Replace ⇒ “1.4 Removing and installing differential pressure transmitter G505 ”, page 326

6 - Mounting bracket

- ❑ Differential pressure transmitter - G505-

7 - Spring strap clamps

8 - Hose

9 - Nut

- ❑ 9 Nm

10 - Heat shield

11 - Lambda probe - G39-

- ❑ the thread of new lambda probes must be coated with assembly paste
- ❑ when installing an already used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body
- ❑ use spanner set 17 mm - T10395- for removing and installing

- ❑ 50 Nm

12 - Exhaust gas temperature transmitter 4 - G648-

- ❑ the thread of the temperature sender is coated
- ❑ do not apply additional oil or grease to the thread
- ❑ use spanner set 17 mm - T10395- for removing and installing
- ❑ 60 Nm

13 - Seal

- ❑ Replace after disassembly
- ❑ Check fitting position

14 - Fixing clamp

- ❑ Replace after disassembly
- ❑ 7 Nm

15 - Exhaust gas temperature transmitter 3 - G495-

- ❑ the thread of the temperature sender is coated
- ❑ do not apply additional oil or grease to the thread
- ❑ use spanner set 17 mm - T10395- for removing and installing
- ❑ 60 Nm

16 - Screw

- ❑ 25 Nm

17 - to rear silencer

18 - Hanger

- ❑ replace if damaged

19 - Exhaust pipe

- ❑ with particle filter and oxidation catalytic converter
- ❑ after replacing, the adaptation of the ash mass balance must be set to “0” ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ “1.5 Removing and installing pre-exhaust pipe with particle filter”, page 327

20 - Mounting bracket

- ❑ screwed onto the cylinder block

21 - Pressure line

- ❑ If not present, close with dummy plug.
- ❑ 45 Nm

22 - Mounting bracket

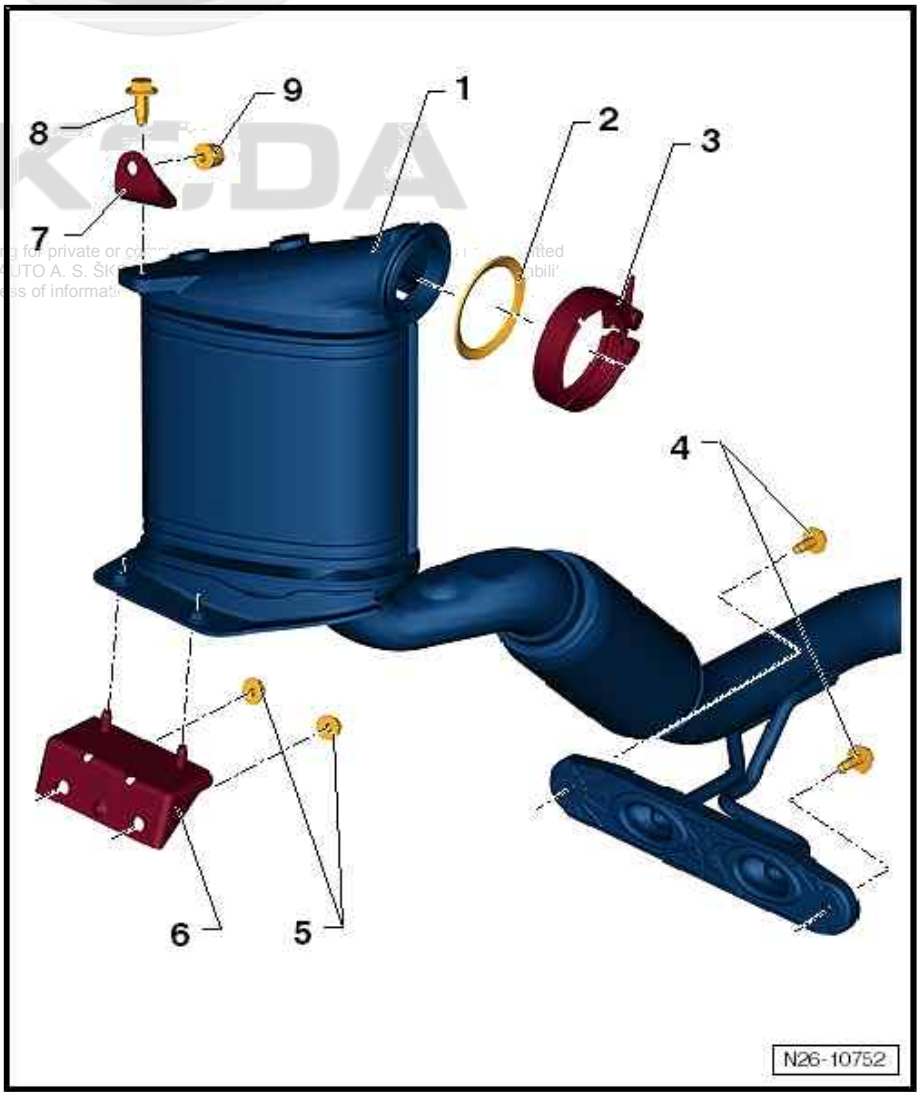
- ❑ screwed onto the cylinder head

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1.1.2 Summary of components - Pre-exhaust pipe with catalytic converter

Note

- *The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.*
- *Secure the decoupling element with the transport lock - T10403- to prevent over-tensioning.*
- *Replace the gaskets and the self-locking nuts.*
- *When performing installation work on the exhaust system, make sure the exhaust system is not mounted under tension and has adequate clearance from the vehicle body. If necessary, slacken the clamping sleeve and align the exhaust system so as to create all round adequate clearance to the body and so that the weight is evenly distributed over the hangers.*



1 - Exhaust pipe
- ❑ with oxidation catalytic converter and particle loss system
- ❑ Removing and installing ⇒ “1.6 Removing and installing pre-exhaust pipe with catalytic converter”, page 331

2 - Seal
- ❑ Replace after disassembly
- ❑ Check fitting position

3 - Fixing clamp
- ❑ Replace after disassembly
- ❑ 7 Nm

4 - Screw
- ❑ 25 Nm

5 - Nut
- ❑ 25 Nm

6 - Mounting bracket
- ❑ screwed onto the cylinder block
- ❑ Replace bracket with riveted threaded bolts (the required tightening torque can only be applied in this way)

7 - Mounting bracket
- ❑ screwed onto the cylinder head

8 - Screw
- ❑ 25 Nm

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9 - Nut

- ❑ 25 Nm

1.2 Summary of components - Middle and rear part of the exhaust system

⇒ “1.2.1 Summary of components - middle and rear part of the exhaust system (Octavia II with front-wheel drive)”, page 320

⇒ “1.2.2 Summary of components - middle and rear part of the exhaust system (Octavia II with four-wheel drive and Superb II with engine identification characters CLJA)”, page 321

⇒ “1.2.3 Summary of components - Middle and rear part of the exhaust system (Superb II with engine identification characters CFFB, CFGB)”, page 323

⇒ “1.2.4 Summary of components - middle and rear silencer (Yeti)”, page 324

1.2.1 Summary of components - middle and rear part of the exhaust system (Octavia II with front-wheel drive)

1 - Clamping sleeve

- ❑ align the exhaust system free of stress before tightening ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ installing ⇒ page 337
- ❑ Tighten bolted connections evenly

2 - Middle part of exhaust system

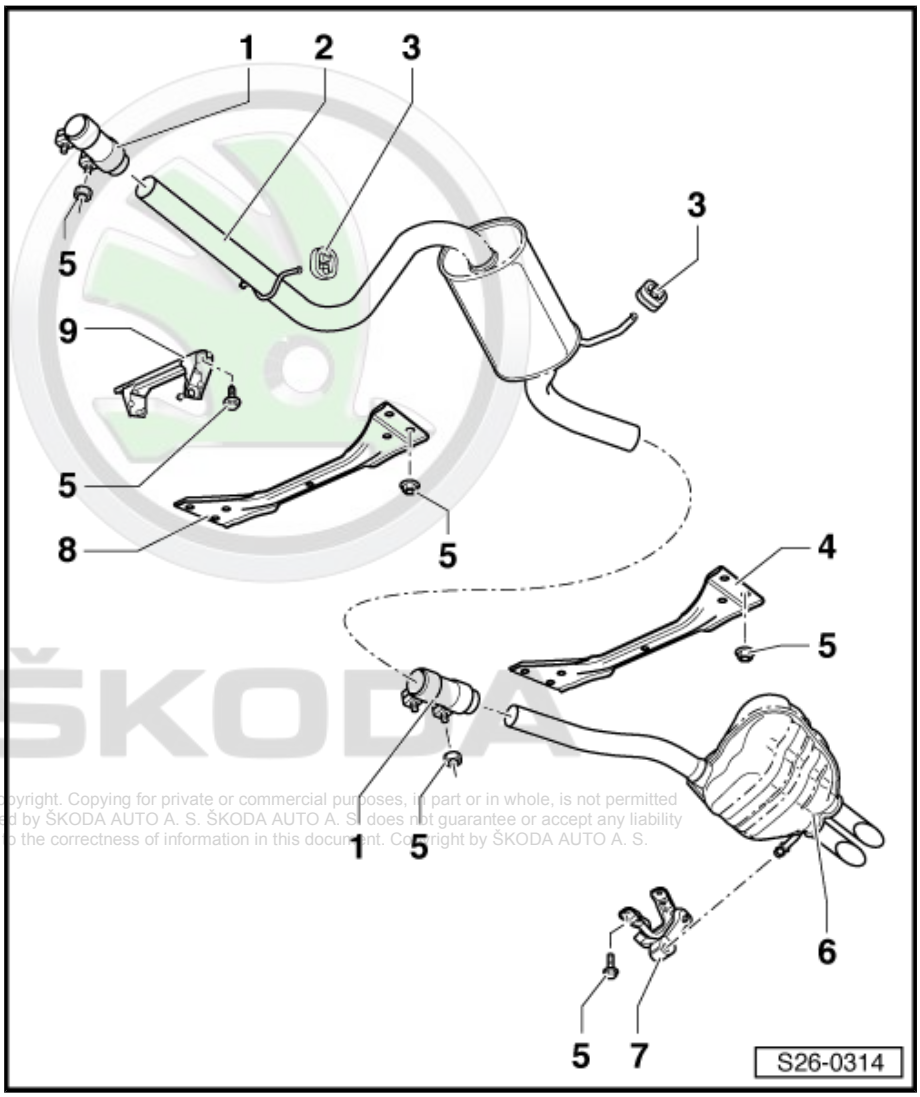
- ❑ for first equipment, a building unit with rear silencer, replace individually when carrying out repairs ⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335
- ❑ Installing the exhaust system without tension ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ Separation point ⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335

3 - Retaining strap

- ❑ replace if damaged
- ❑ Pay attention to the part number

4 - Tunnel bridge

- ❑ rear



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5 - Nut

- ❑ 23 Nm

6 - Rear part of exhaust system

- ❑ for first equipment, a building unit with middle silencer, replace individually when carrying out repairs ⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335
- ❑ Installing the exhaust system without tension ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ Separation point ⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335

7 - Retaining strap

- ❑ replace if damaged
- ❑ Pay attention to the part number

8 - Tunnel bridge

- ❑ front

9 - Hanger

1.2.2 Summary of components - middle and rear part of the exhaust system (Octavia II with four-wheel drive and Superb II with engine identification characters CLJA)

1 - Middle and rear part of the exhaust system

- ❑ for first equipment a building unit, replace individually when carrying out repairs
- ❑ Installing the exhaust system without tension ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ Separation point ⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335

2 - Retaining strap

- ❑ replace if damaged
- ❑ Pay attention to the part number

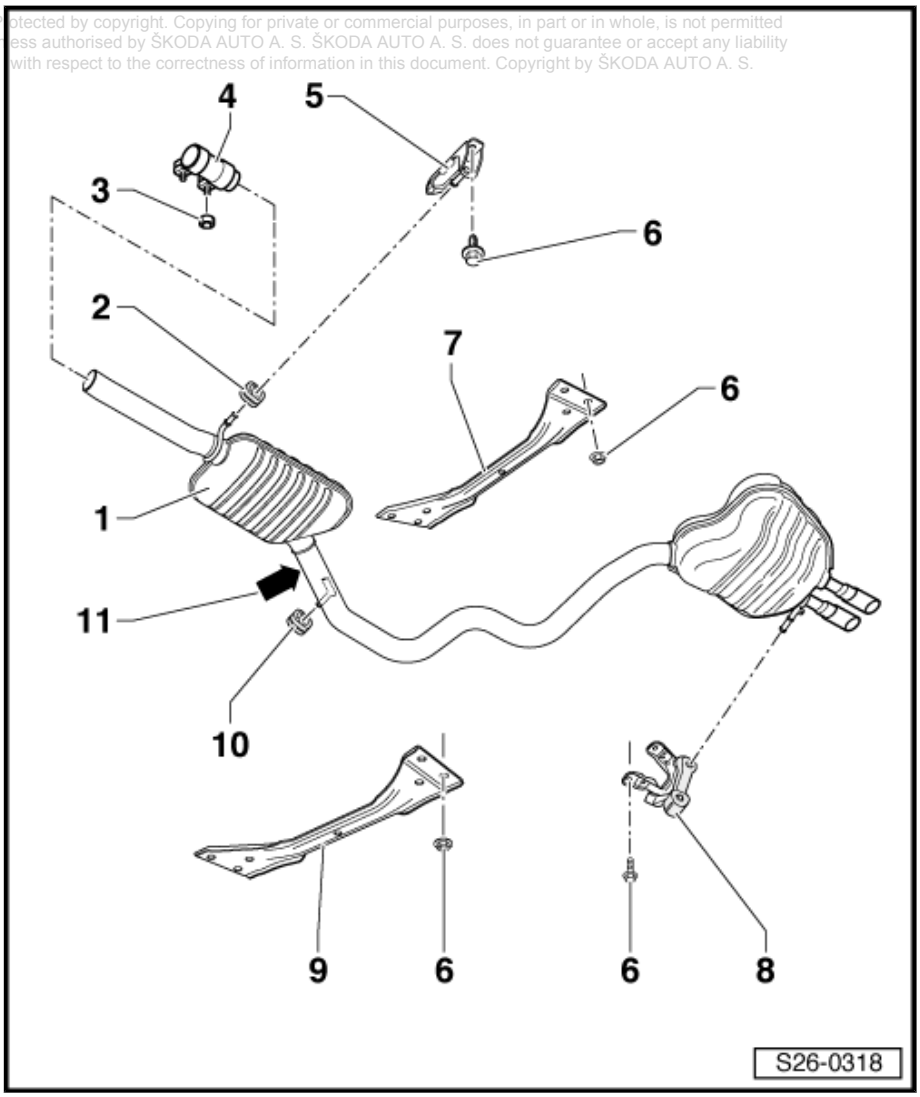
3 - Nut

- ❑ 23 Nm

4 - Clamping sleeve

- ❑ align the exhaust system free of stress before tightening ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ installing ⇒ page 337
- ❑ Tighten bolted connections evenly

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5 - Hanger

6 - Screw

- ❑ 23 Nm

7 - Tunnel bridge

- ❑ front

8 - Retaining strap

- ❑ replace if damaged
- ❑ Pay attention to the part number

9 - Tunnel bridge

- ❑ rear

10 - Retaining strap

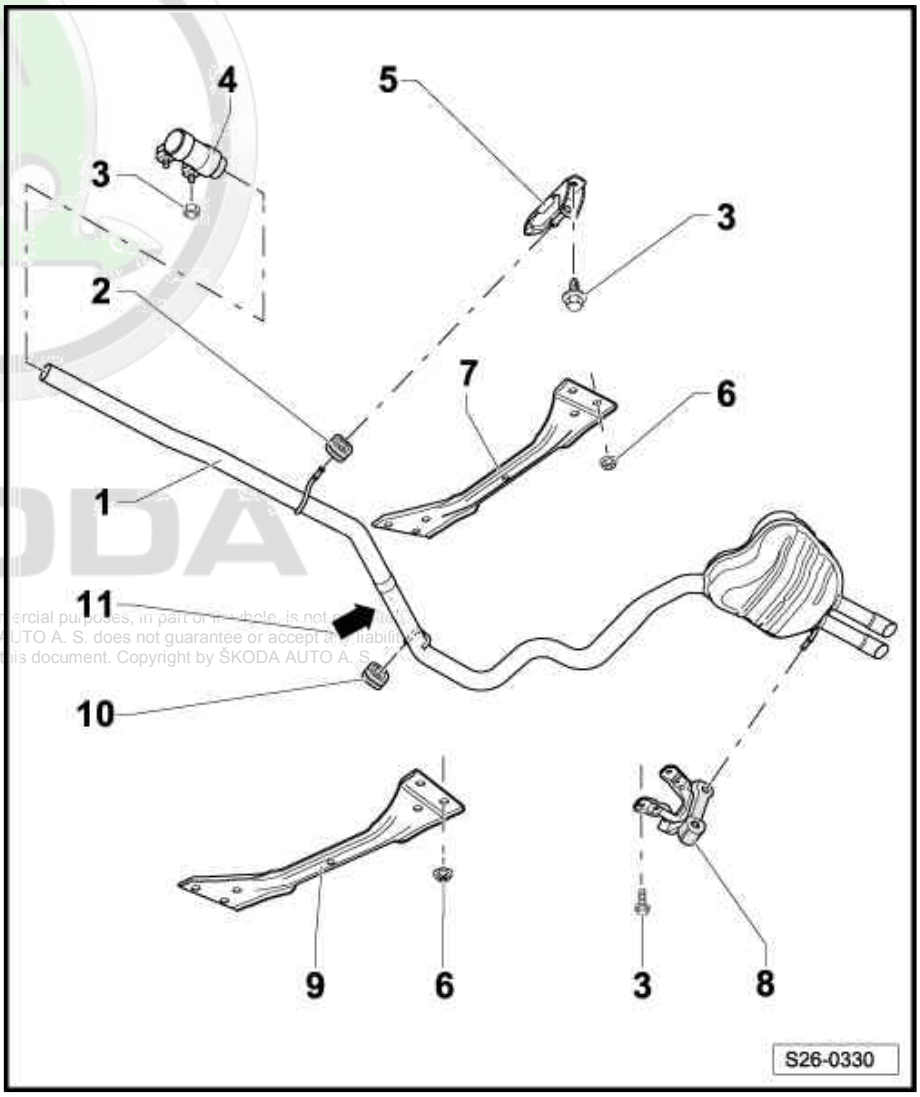
- ❑ replace if damaged
- ❑ Pay attention to the part number

11 - Separation point

- ❑ Separation point ⇒ “1.7 Replacing middle or rear part of the exhaust system”, page 335

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1.2.3 Summary of components - Middle and rear part of the exhaust system (Superb II with engine identification characters CFFB, CFGB)



1 - Middle and rear part of the exhaust system

- ❑ for first equipment a building unit, replace individually when carrying out repairs
- ❑ Installing the exhaust system without tension ⇒ “1.8 Align exhaust system free of stress”, page 336

2 - Retaining strap

- ❑ replace if damaged

3 - Nut

- ❑ 23 Nm

4 - Clamping sleeve

- ❑ align the exhaust system free of stress before tightening ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ installing ⇒ page 337
- ❑ Tighten screwed connections uniformly

5 - Hanger

6 - Nut

- ❑ 20 Nm

7 - Front tunnel bridge

8 - Hanger

- ❑ replace if damaged

9 - Rear tunnel bridge

10 - Retaining strap

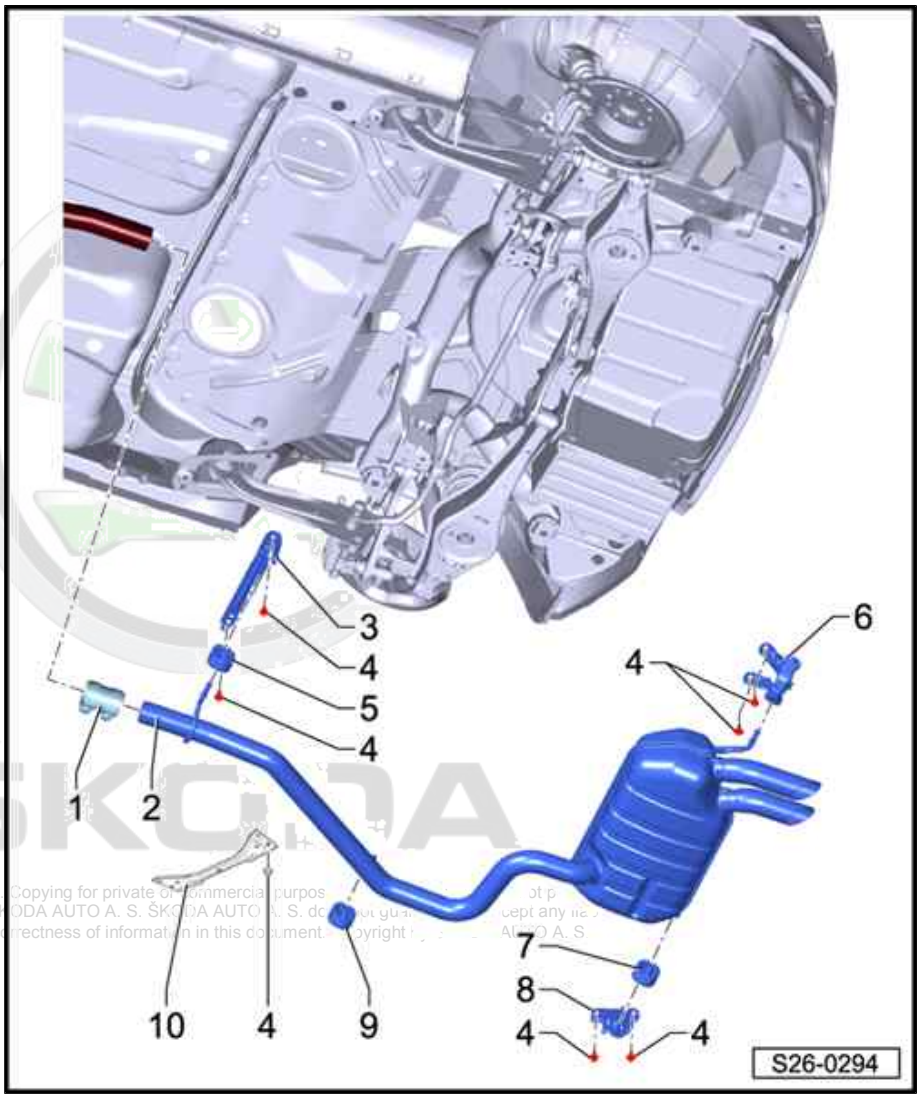
- ❑ replace if damaged
- ❑ Pay attention to the part number

11 - Separation point

- ❑ for repairs
- ❑ marked with recesses around the circumference

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1.2.4 Summary of components - middle and rear silencer (Yeti)



1 - Clamping sleeve

- ❑ align the exhaust system free of stress before tightening ⇒ “1.8 Align exhaust system free of stress”, page 336
- ❑ installing ⇒ page 337
- ❑ Tighten bolted connections evenly

2 - Rear part of exhaust system

- ❑ Installing the exhaust system without tension ⇒ “1.8 Align exhaust system free of stress”, page 336

3 - Hanger

4 - Screw

- ❑ 25 Nm

5 - Retaining strap

- ❑ replace if damaged
- ❑ Pay attention to the part number

6 - Hanger

- ❑ replace if damaged

7 - Retaining strap

- ❑ replace if damaged
- ❑ Pay attention to the part number

8 - Unbolt bracket for exhaust pipe

- ❑ firmly riveted with the heat protection plate of the fuel tank

9 - Retaining strap

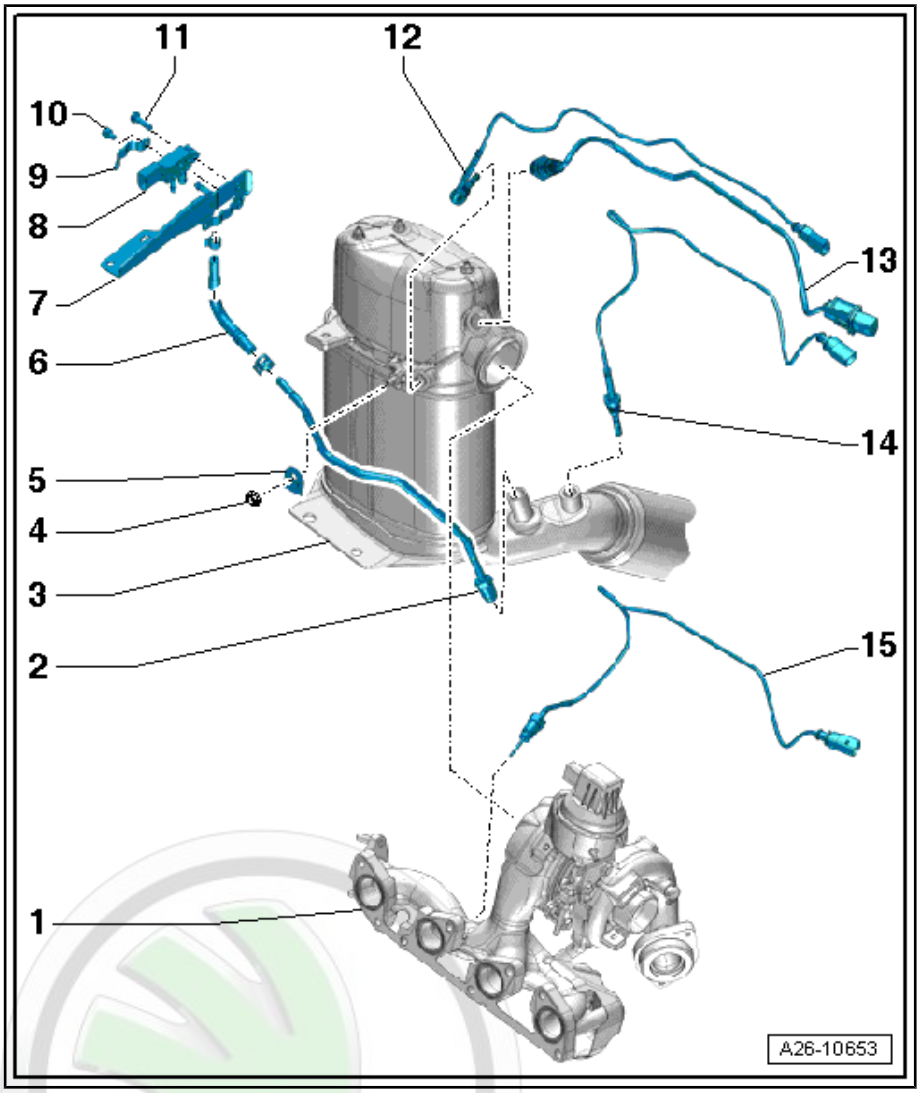
- ❑ replace if damaged
- ❑ Pay attention to the part number

10 - Tunnel bridge

1.3 Summary of components - exhaust temperature regulation

WARNING

The threads of the exhaust gas temperature sender - G495- and -G648- are coated. They MUST NOT be greased additionally with hot bolt paste and must be tightened to the tightening torque stated in the table below. Otherwise the screwed connection can slacken and this could result in a failure.



1 - Exhaust gas turbocharger
- ❑ with exhaust manifold

2 - Pressure line
- ❑ 45 Nm

3 - Particle filter

4 - Nut
- ❑ 9 Nm

5 - Mounting bracket
- ❑ screwed to the particle filter

6 - Hose

7 - Mounting bracket

8 - Differential pressure transmitter - G505-

> **Caution**
> *Risk of damage!*
> *The differential pressure sender - G505- is very sensitive and therefore requires the utmost care. It must not touch somewhere when laying it down.*
>
> *Only detach the hose from the differential pressure sender - G505- if it must be replaced.*

- ❑ Replace
⇒ “1.4 Removing and installing differential pressure transmitter G505 ”, page 326

9 - Mounting bracket

10 - Screw
- ❑ 5 Nm

11 - Screw
- ❑ 8 Nm

12 - Exhaust gas temperature transmitter 3 - G495-
- ❑ the thread of the temperature sender is coated
- ❑ do not apply additional oil or grease to the thread
- ❑ use spanner set 17 mm - T10395- for removing and installing
- ❑ 60 Nm

13 - Lambda probe - G39-
- ❑ the thread of new lambda probes must be coated with assembly paste
- ❑ when installing an already used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3 - must not get into the slots of the probe body
- ❑ use spanner set 17 mm - T10395- for removing and installing
- ❑ 50 Nm

14 - Exhaust gas temperature transmitter 4 - G648-
- ❑ the thread of the temperature sender is coated
- ❑ do not apply additional oil or grease to the thread

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- ❑ use spanner set 17 mm - T10395- for removing and installing
- ❑ 60 Nm

15 - Exhaust gas temperature sender 1 - G235- (Temperature sender upstream of turbocharger - G507-)

- ❑ the thread of new temperature transmitters must be coated with assembly paste
- ❑ coat thread with hot bolt paste - G 052 112 A3- before installing an already used sender
- ❑ Removing and installing
  ⇒ “1.4 Removing and installing exhaust gas temperature sender 1 G235 (temperature sender upstream turbocharger G507)”, page 243
- ❑ 45 Nm

1.4 Removing and installing differential pressure transmitter - G505-

The differential pressure sender - G505- determines the volumetric efficiency of the particle filter volume. It is connected to the measuring point behind the particle filter via a pressure line and to the particle filter via another control line.

- If the lines or hoses are clogged with soot, which significantly constricts their cross section, then the sender together with the bracket and the connected hoses must be completely replaced.

Caution

The differential pressure sender - G505- is very sensitive to shock load and leaks.

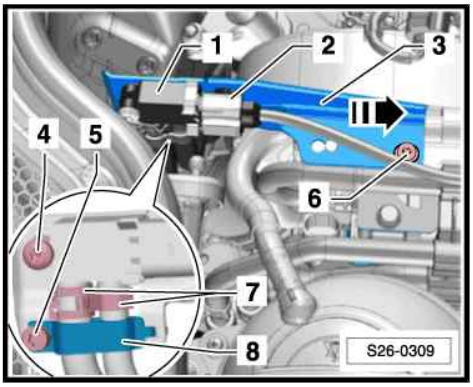
- *Therefore the hoses of the sender must only be removed if the sender is damaged.*
- *Furthermore there is the risk that the hose connections break off when the hoses are removed.*

Removing

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

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– Disconnect the plug -2- at the differential pressure sender - G505- -1-.
– Screw out screw -6- and detach bracket -3- with differential pressure sender - G505- in -direction of arrow- from the bracket for additional fuel pump - V393- or fuel pump 2 - V277- .
– Release screw -5- and remove bracket -8-.
– Release spring strap clamps -7- and detach the hoses from the connection fittings of the differential pressure sender - G505- -1-.
– Release screw -4- and unclip the differential pressure sender - G505- -1- from the bracket -3-.



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

Note

- *Before installing, blow through the pressure lines to the differential pressure sender - G505- in order to avoid blockage.*
- *Pay attention to the tight fit and leaktightness of the connections.*

– An adaptation must be carried out after replacing the differential pressure sender - G505- ⇒ Vehicle diagnostic tester.

The work procedure for the adaptation is described in the “Targeted fault finding”. It is also described under “Targeted functions”.

– Select the correct vehicle in the targeted fault finding.
– Press “Skip” button.
– Press “Selected Functions/Components”.
– Select “Drive”.
– Select “01 - Self-diagnosable systems”.
– Select “01 - Engine electronics J623”.
– “Select 01 - Engine electronics, functions”.
– “01 - Erase initialisation values (Rep. size 21 - 28)”.

Tightening torques - summaries of components

- Screws for differential pressure indicator - G505- ⇒ “1.1.1 Summary of components - pre-exhaust pipe with particle filter”, page 316

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1.5 Removing and installing pre-exhaust pipe with particle filter

Special tools and workshop equipment required

- Ratchet ring wrench - T10384-
- Lambda probe open ring spanner set
- Set of tools - T10395-
- Transport security - T10404-
- Hot bolt paste - G 052 112 A3-

Removing

Vehicles with front-wheel drive with left-hand drive

– Lower the assembly carrier with steering gear in the service position ⇒ Chassis; Rep. gr. 40 .

Vehicles with front-wheel drive with right-hand drive and vehicles with four-wheel drive

– Remove assembly carrier with steering gear ⇒ Chassis; Rep. gr. 40 .

Vehicles with auxiliary heating

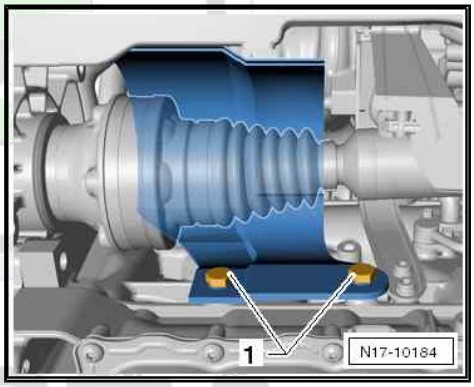
– Remove mounting bracket for refrigerant lines for auxiliary heating from cylinder block or angle gearbox and oil pan.

Continued for all vehicles

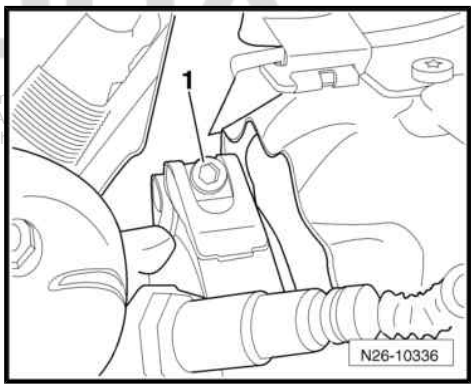
– Unscrew screws -1- of protective plate for right drive shaft, if present.

– Remove right drive shaft ⇒ Chassis; Rep. gr. 40

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .



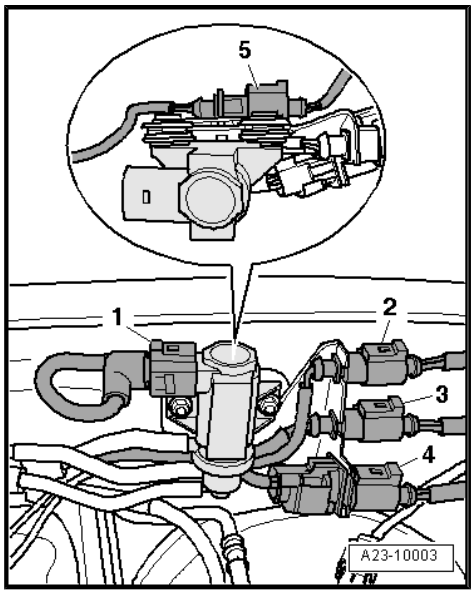
– Remove warm-type clamp -1- between the particle filter and exhaust turbocharger.



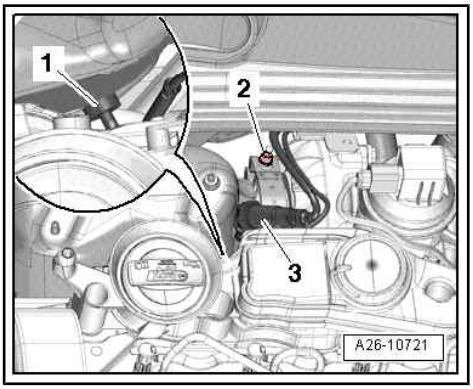
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– Disconnect the following plug connections:

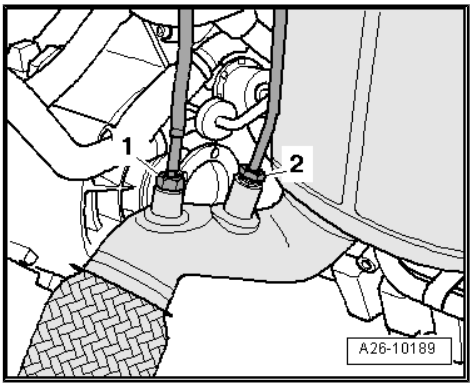
- Position 2: exhaust gas temperature sender 4 - G648- (orange)
- Position 4: lambda probe - G39- (black)
- Position 5: exhaust gas temperature sender 3 - G495- (brown)



– Remove lambda probe - G39- -3-.



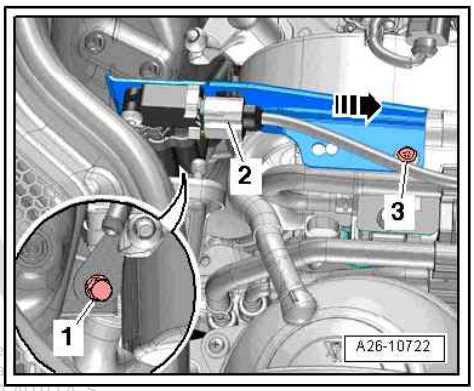
– Unscrew the exhaust gas temperature sender 4 - G648- -1- from the pre-exhaust pipe using the socket insert SW 17 mm from the set of tools - T10395- .



– Disconnect plug -2- at differential pressure indicator - G505- .

– Screw out screw -3- and remove bracket with differential pressure indicator - G505- from the bracket of the additional fuel pump in -direction of arrow-.

– Remove the differential pressure sender - G505- from the bracket with the hoses connected
⇒ “1.4 Removing and installing differential pressure transmitter G505 ”, page 326 .



Caution

Risk of damage!

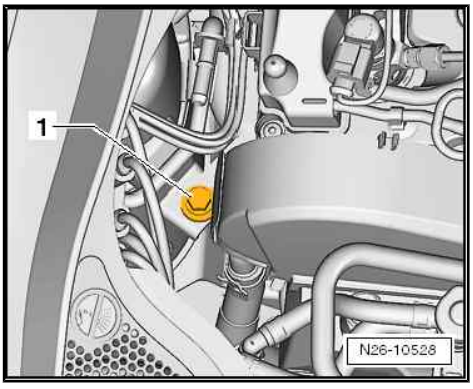
- ***The differential pressure sender - G505- is very sensitive and therefore requires the utmost care. It must not touch somewhere when laying it down.***

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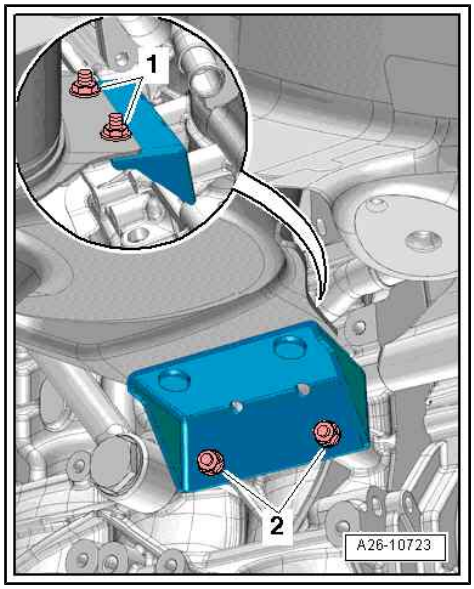
– Attach the differential pressure encoder - G505- to the particle filter with the hoses connected.

– Release the screw -1- of the bracket at the cylinder head.

– Slacken the clamping sleeve and slide it backwards.

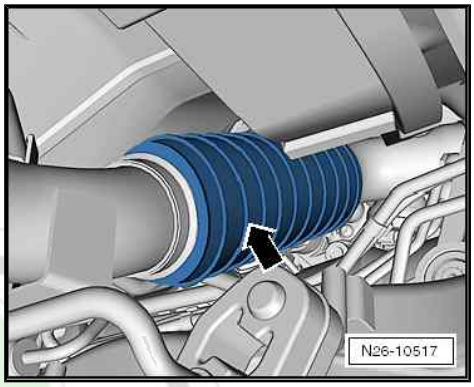


– Unscrew nuts -1- using the ratchet ring wrench - T10384- .
– Release nuts -2- and remove bracket for pre-exhaust pipe.



Note

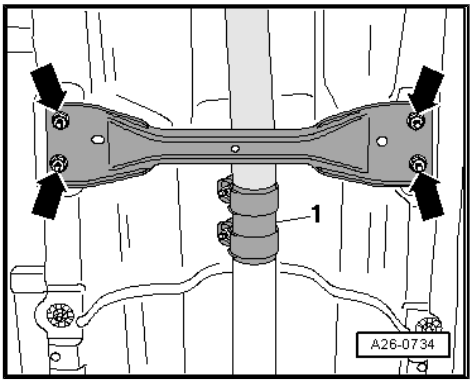
- *The assistance of a second mechanic is required for removing the pre-exhaust pipe.*
- *The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.*
- *Secure the decoupling element with the transport security - T10404- against overtensioning -arrow-.*



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– Remove tunnel bridge -arrows-.

– Remove particle filter downwards.



Installing

Note

- *The decoupling element in the pre-exhaust pipe should not be bent by more than 10° and over-tensioned - risk of damage.*
- *Secure the decoupling element against damage by means of the transport security - T10404- .*

Assembly is carried out in the reverse order. When installing, observe the following:

- Replace gasket and fixing clamp for pre-exhaust pipe.

– First fasten the pre-exhaust pipe loosely to the exhaust gas turbocharger and then fasten to the bottom bracket.

– Align exhaust system free of stress
⇒ “1.8 Align exhaust system free of stress”, page 336 .

After replacing the particle filter, the adaptation of the ash mass balance must be set to “0” ⇒ Vehicle diagnostic tester.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Summary of components
⇒ “1.1.1 Summary of components - pre-exhaust pipe with particle filter”, page 316 .

1.6 Removing and installing pre-exhaust pipe with catalytic converter

Special tools and workshop equipment required

- Lifting device - MP9-201 (2024A)-
- Ratchet ring wrench - T10384-
- Hot bolt paste - G 052 112 A3-
- Pliers for spring-type clips
- Transport security - T10403-
- Screw M10 x 30

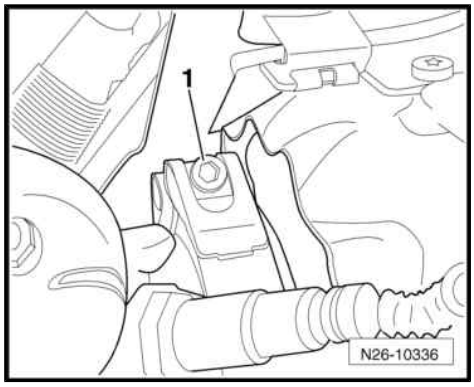
Removing

– Switch off ignition and pull out ignition key.

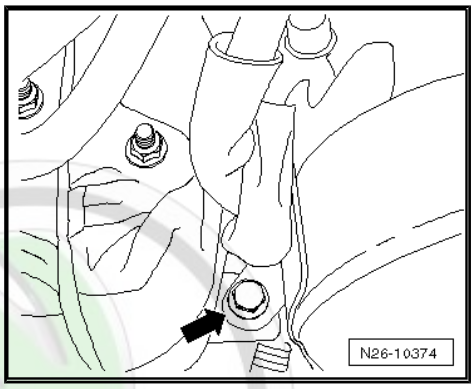
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

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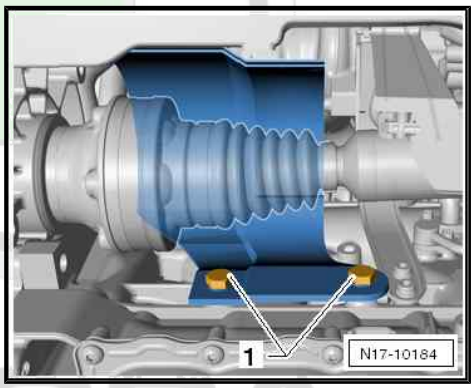
– Remove fixing clamp -1- between pre-exhaust pipe and exhaust turbocharger.



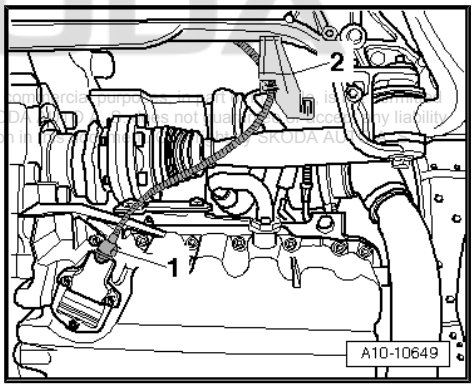
– Unscrew screw for top attachment.
– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .



– Unscrew screws -1- of protective plate for right drive shaft, if present.
– Remove right drive shaft ⇒ Chassis; Rep. gr. 40

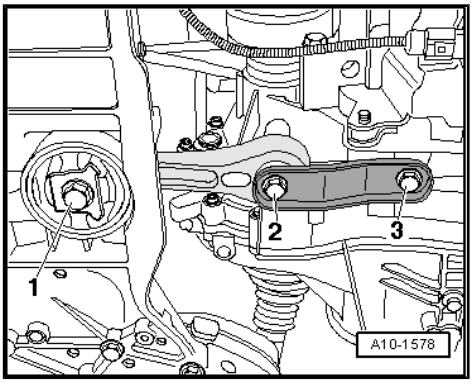


– Disconnect electrical plug connection -1- at the oil level and oil temperature sender - G266- .
– Remove bracket -2- for the wiring harness of the oil level and oil temperature sender - G266- from the assembly carrier.
– Slacken the clamping sleeve and slide it backwards.

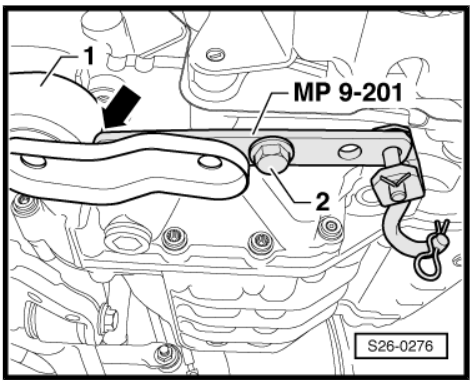


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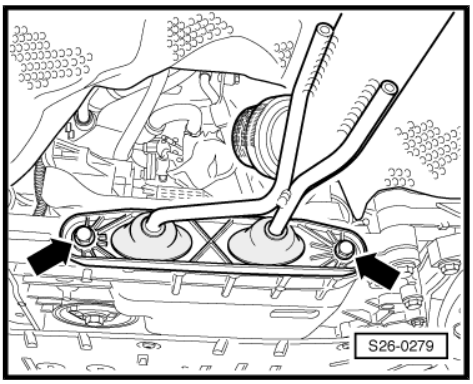
– Unscrew the screws -2- and -3- of the pendulum support.



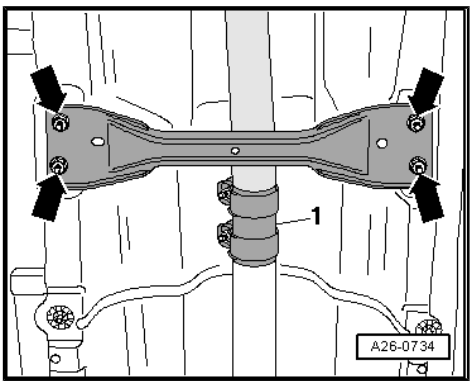
– Push the engine forwards approx. 35 mm and fasten it with the hanger from -MP9-201- and the screw -2- (M10 x 30) at the pendulum support -1- -arrow-.



– Unbolt bracket for pre-exhaust pipe -arrows-.

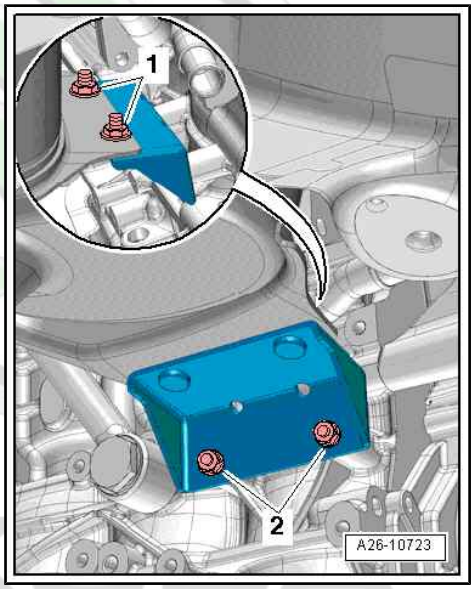


– Unscrew the front cross member -arrows-.



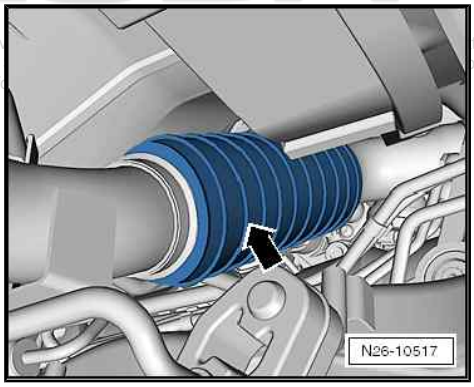
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– Unscrew nuts -1- using the ratchet ring wrench - T10384- .
– Release nuts -2- and remove bracket for pre-exhaust pipe.

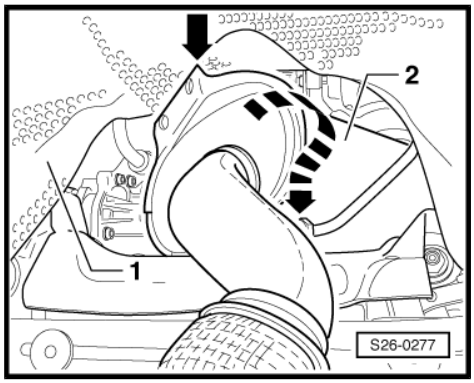


Note

- *The assistance of a second mechanic is required for removing the pre-exhaust pipe.*
- *The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.*
- *Secure the decoupling element with the transport security - T10403- against overtensioning -arrow-.*



– Turn pre-exhaust pipe -1- by 180° -in direction of arrow- and pull out.



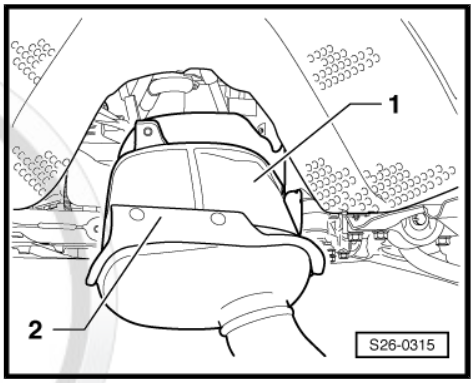
Note

If the bracket should obstruct when pulling out -arrow-, slightly push aside the heat shield -2- if necessary.

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Installing

– Insert the pre-exhaust pipe -1- with the bracket -2- upwards as shown and turn to the left by 180°.



Further installation occurs in reverse order. However, pay attention to the following:

- Replace gasket and fixing clamp for pre-exhaust pipe.

– First fasten the pre-exhaust pipe loosely to the exhaust gas turbocharger and then fasten to the bottom bracket.

– Align exhaust system free of stress
⇒ “1.8 Align exhaust system free of stress”, page 336 .

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

- Summary of components
⇒ “1.1.2 Summary of components - Pre-exhaust pipe with catalytic converter”, page 319 .
- Pendulum support
⇒ “1.5 Assembly overview - assembly mountings”, page 26

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1.7 Replacing middle or rear part of the exhaust system

Special tools and workshop equipment required

- Body saw , e.g. -V.A.G 1523 A- or chain pipe cutter , e.g. -VAS 6254-
- Protective goggles

Note

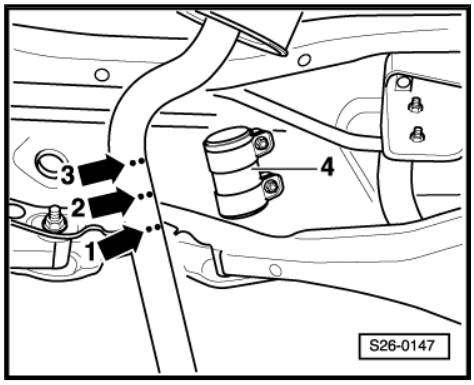
- *For replacing the middle or rear silencer, a separation point is provided for repairs in the connecting pipe.*
- *The separation point is marked by indentation on the circumference of the exhaust pipe.*
- *In case of repairs, the middle and rear silencers in Superb II vehicles with engine identification characters CFFB and CFGB can only be replaced completely ⇒ ETKA - Electronic Catalogue of Original Parts*

For vehicles with middle and rear part of the exhaust system as a single unit for installation

WARNING

To avoid injury from metal shavings, wear eye protection and protective clothing.

– Cut exhaust pipe at right angles at the separation point -arrow 2-.



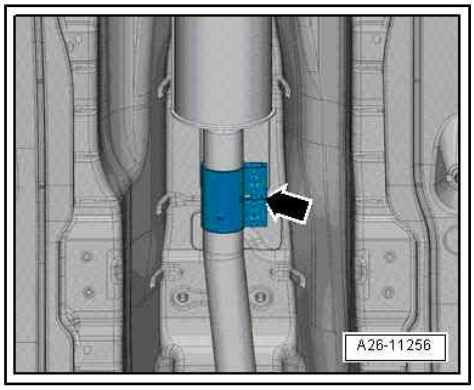
For vehicles with separable middle and rear part of the exhaust system

– Loosen the rear clamping sleeve and slide it off.

Replace middle part of exhaust system

– Loosen the front clamping sleeve -arrow- and slide it off.

– Remove the hanger of the middle part of the exhaust system and remove middle part.



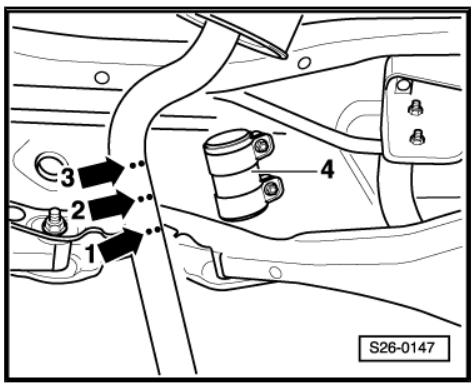
Replace rear part of the exhaust system

– Remove hanger of rear part of exhaust system and remove rear part.

Installing

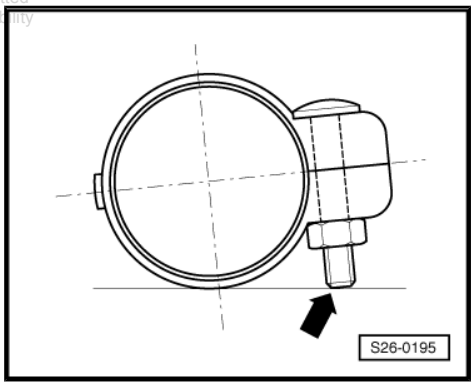
Installation is carried out in the reverse order. When installing, note the following instructions:

– When installing, position clamping sleeve -4- at the side markings arrow -1- and arrow -3-.



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– Rotate the clamping sleeve so that the screw ends -arrow- do not protrude beyond the lower edge of the clamping sleeve.



– Align exhaust system in cold condition free of stress ⇒ “1.8 Align exhaust system free of stress”, page 336 .

– Tighten the clamping sleeve to the specified tightening torque.

Tightening torques - summaries of components

Note

Replace bolts / nuts that are tightened at an angle of rotation, as well as replacement components after removal.

♦ Clamping sleeve and hangers of the exhaust system ⇒ “1.2 Summary of components - Middle and rear part of the exhaust system”, page 320 .

1.8 Align exhaust system free of stress

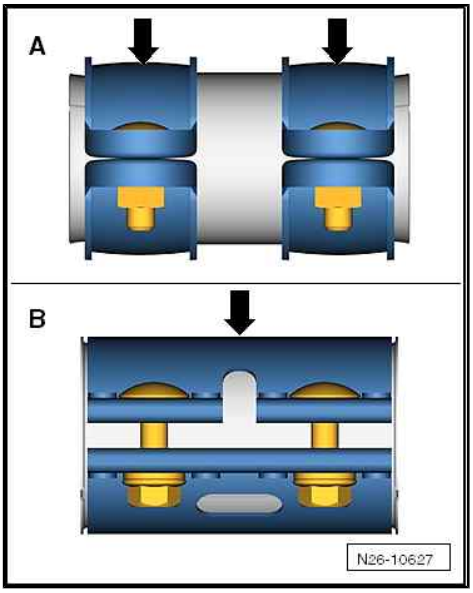
• The exhaust system is aligned when cold.

Clamping sleeves

Note

- *Continuous clamping sleeves are used successively.*
- *Tighten bolted connections evenly.*

Versions, fitting dimensions and tightening torques of clamping sleeves



A - Clamping sleeves with two divided sleeves

Tightening torque: 25 Nm

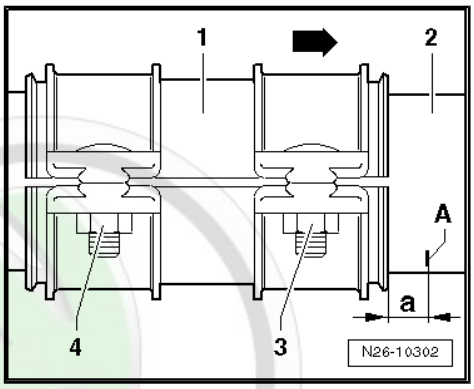
Installation dimensions -a- 5 mm (only front clamp)

B - Clamping sleeve with a continuous sleeve

Tightening torque: 35 Nm

Installation dimensions -a- 8.5 mm (only front clamp)

Install clamping sleeve on vehicles with marking on the pre-exhaust pipe



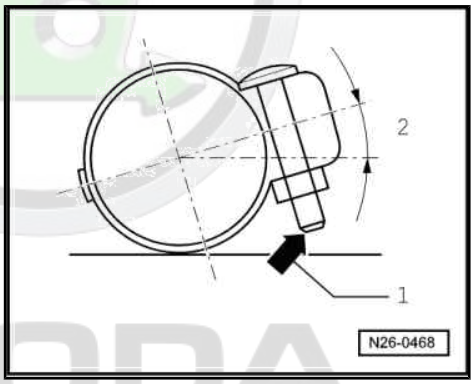
1 - Clamping sleeve

2 - Exhaust pipe

a - Installation dimension

A - Brand

Installation position of front clamp



- bolted connection points to the right.

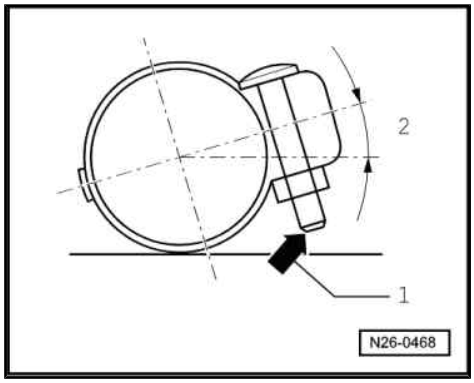
– Install clamping sleeve in such a way that the ends of the screws -arrow 1- do not protrude beyond the bottom edge of the clamping sleeve.

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Installation position of rear clamp

- Threaded connection faces to rear.

– Install clamping sleeve in such a way that the ends of the screws -arrow 1- do not protrude beyond the bottom edge of the clamping sleeve.



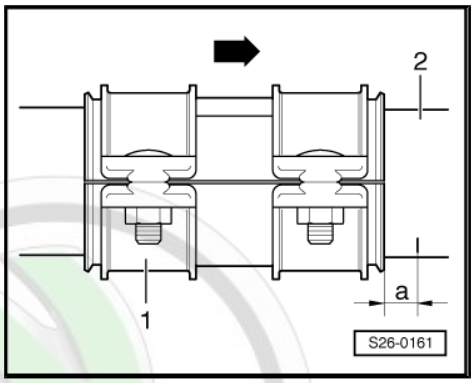
Align exhaust system free of stress

– Slacken front clamping sleeve -1- and align to exhaust pipe -2- (-arrow- points in direction of travel).

-a- = 5 mm

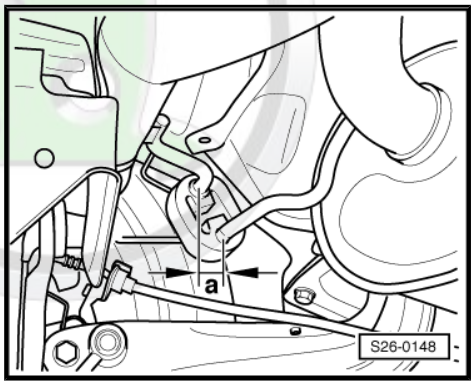
The fixing screws must be located on the right. The screws must not protrude beyond the bottom edge of the clamping sleeve.

– Tighten front nut by hand.



Vehicles with front-wheel drive

– Push the exhaust system so far forward until the initial load on the rear retaining strap at the middle part of the exhaust system -a- = 9...11 mm.

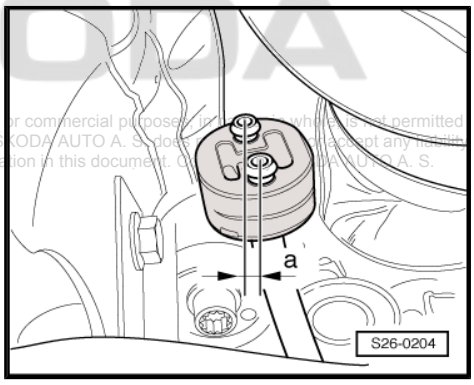


Vehicles Octavia II with four-wheel drive

– Push the exhaust system so far forward until the initial load on the rear retaining strap at the middle part of the exhaust system -a- = 7...9 mm.

Continued for all vehicles

– Tighten the nuts of the front clamping sleeve evenly ⇒ page 337 .



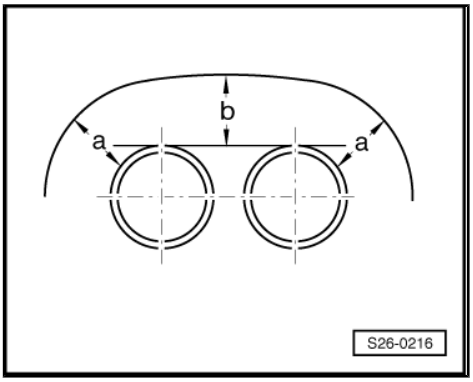
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Align exhaust tailpipes

– Align rear part of exhaust system:

- There must be an equal distance -a- between bumper opening and exhaust tailpipe.
- The distance -b- from the bumper opening to the exhaust tailpipes is equal.

For aligning, loosen the hangers of the exhaust gas system.



1.9 Inspecting the exhaust system for leaks

– Start engine and run in idle.

– Seal off exhaust tailpipes for the duration of the leak check (e.g. with cloth or plug).

– Inspect connection points of cylinder head/exhaust manifold, exhaust gas turbocharger/pre-exhaust pipe etc. for leaktightness by listening and visual inspection.

– Eliminate any leak found.

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2 Exhaust gas recirculation system

⇒ “2.1 Summary of components - Exhaust gas recirculation with radiator”, page 340

⇒ “2.2 Test air-tightness of the radiator for exhaust gas recirculation”, page 344

⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348

⇒ “2.4 Checking change-over flap for radiator for exhaust gas recirculation”, page 351

⇒ “2.5 Clean exhaust gas recirculation system”, page 352

Note

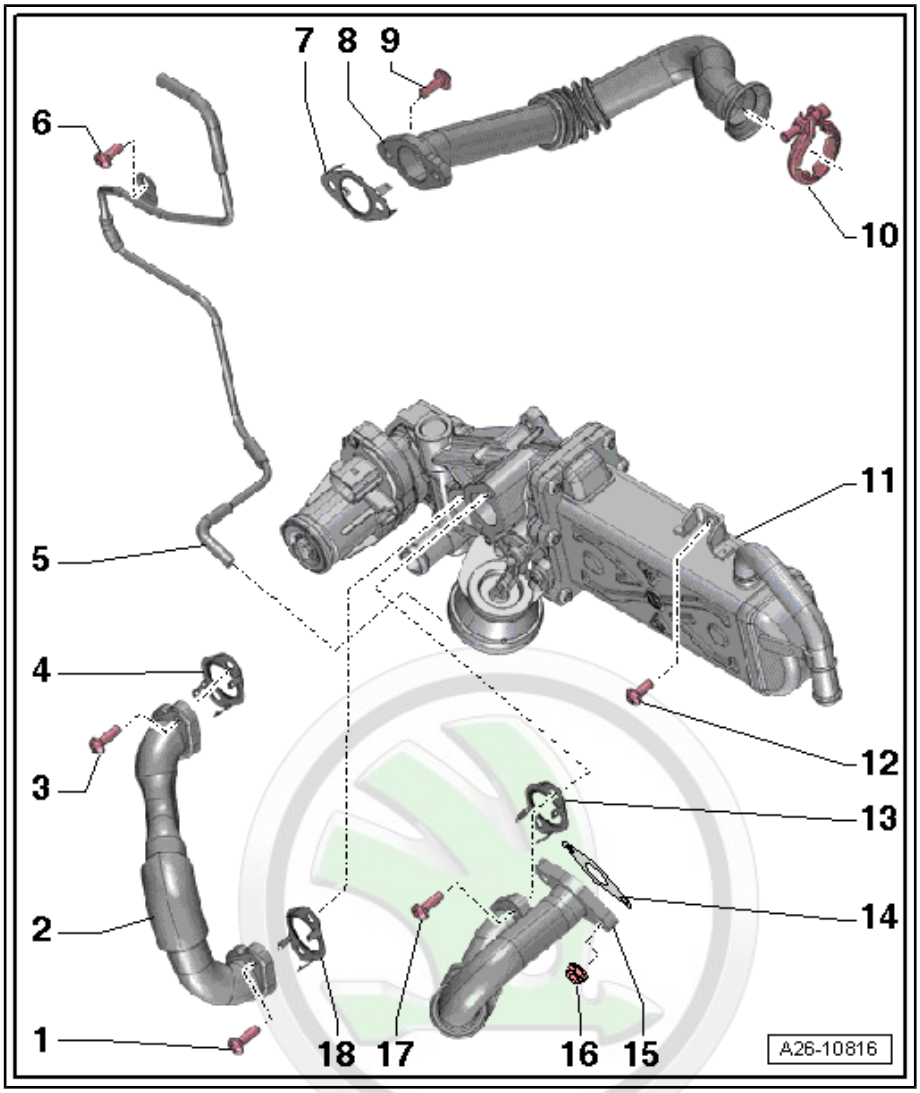
- *The exhaust gas recirculation system is operated by the engine control unit - J623- for EGR valve - N18- .*
- *The EGR valve - N18- consists of the mechanical valve, the EGR control motor - V338- and the EGR potentiometer - G212- .*
- *The electrically controlled valve with cone-shaped valve plunger makes it possible to achieve a uniform modification of the passage diameter depending on the stroke.*
- *Replace self-locking nuts.*

2.1 Summary of components - Exhaust gas recirculation with radiator

Part I

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1 - Screw

- ❑ 9 Nm

2 - Connecting pipe

- ❑ to cylinder head

> **Caution**
> *Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.*

3 - Screw

- ❑ 9 Nm

4 - Seal

- ❑ Replace after disassembly

5 - Vacuum line

- ❑ do not change bending form
- ❑ Connection diagram for vacuum hoses:

♦ Octavia II
⇒ “1.6 Connection diagram for vacuum hoses (Octavia II)”, page 249

♦ Superb II, Yeti
⇒ “1.7 Connection diagram for vacuum hoses (Superb II, Yeti)”, page 251

6 - Screw

- ❑ 9 Nm

7 - Seal

- ❑ Replace after disassembly

8 - Connecting pipe

- ❑ To intake manifold

> **Caution**
> *Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.*

9 - Screw

- ❑ 9 Nm

10 - Fixing clamp

- ❑ Replace after disassembly
- ❑ 5 Nm

11 - Radiator

- ❑ for exhaust gas recirculation
- ❑ with integrated exhaust gas recirculation valve - N18- and with bypass flap

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- ❑ When replacing the radiator, replace all the coolant ⇒ “1.3 Draining and filling coolant”, page 160
- ❑ Test air-tightness of the radiator for exhaust gas recirculation ⇒ “2.2 Test air-tightness of the radiator for exhaust gas recirculation”, page 344
- ❑ Removing and installing ⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348

12 - Screw

- ❑ 9 Nm

13 - Seal

- ❑ Replace after disassembly

14 - Seal

- ❑ Replace after disassembly

15 - Connecting pipe

- ❑ from exhaust manifold

Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

16 - Nut

- ❑ Replace after disassembly
- ❑ 22 Nm

17 - Screw

- ❑ 9 Nm

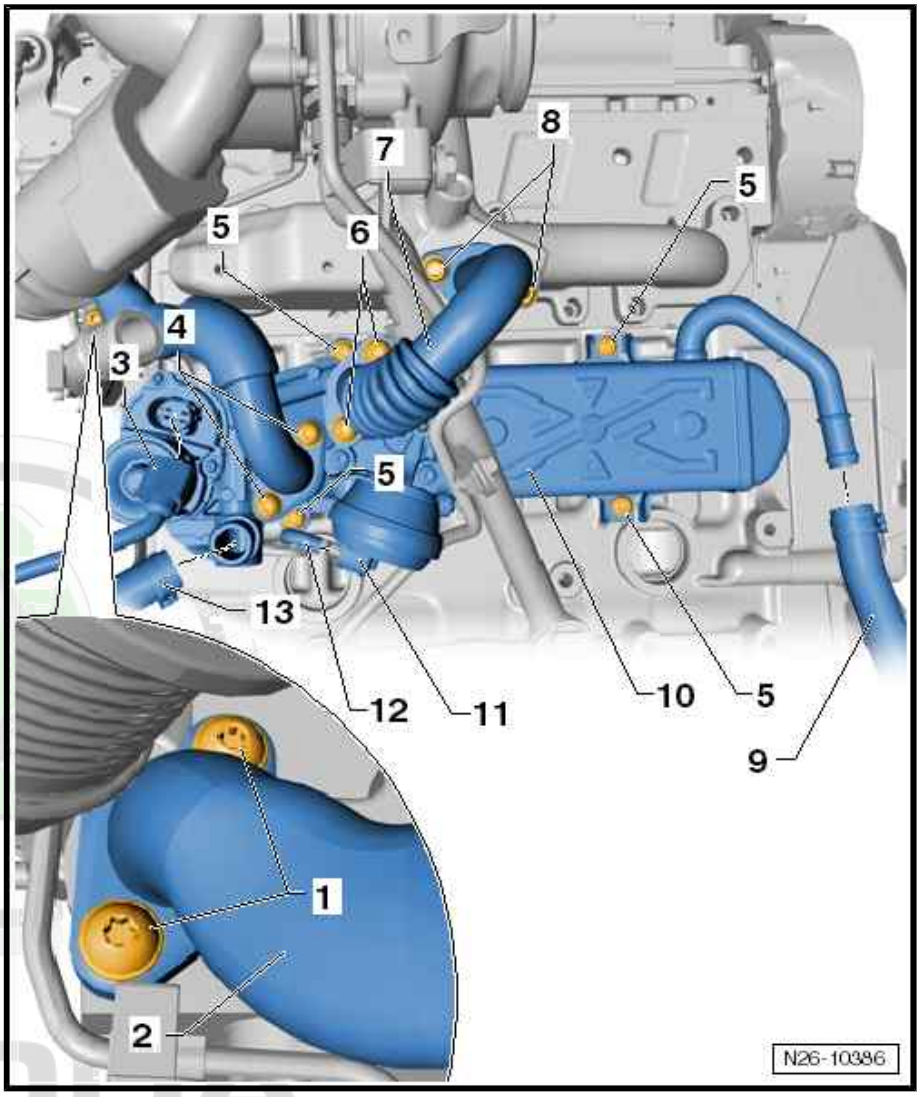
18 - Seal

- ❑ Replace after disassembly

Part II

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1 - Screw

- ❑ 9 Nm

2 - Connecting pipe

- ❑ to cylinder head
- ❑ Replace seal after removal

> **Caution**
> *Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.*

3 - Connector

- ❑ Exhaust gas recirculation valve - N18-

4 - Screw

- ❑ 9 Nm

5 - Screw

- ❑ 10 Nm

6 - Screw

- ❑ 9 Nm

7 - Connecting pipe

- ❑ from exhaust manifold
- ❑ Replace seal after removal

> **Caution**
> *Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.*

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8 - Nut

- ❑ Replace after disassembly
- ❑ 24 Nm

9 - Hose

- ❑ for coolant
- ❑ with clamp

10 - Radiator

- ❑ for exhaust gas recirculation
- ❑ with integrated exhaust gas recirculation valve - N18- and with bypass flap
- ❑ When replacing the radiator, replace all the coolant ⇒ “1.3 Draining and filling coolant”, page 160
- ❑ Test air-tightness of the radiator for exhaust gas recirculation ⇒ “2.2 Test air-tightness of the radiator for exhaust gas recirculation”, page 344
- ❑ Removing and installing ⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348

11 - Vacuum setting element

- ❑ Change-over of bypass flap

12 - Vacuum line

❑ Connection diagram for vacuum hoses:

- Octavia II ⇒ “1.6 Connection diagram for vacuum hoses (Octavia II)”, page 249
- Superb II, Yeti ⇒ “1.7 Connection diagram for vacuum hoses (Superb II, Yeti)”, page 251

13 - Hose

❑ for coolant
❑ with clamp

2.2 Test air-tightness of the radiator for exhaust gas recirculation

Special tools and workshop equipment required

- Cooling system testing device , e.g. -V.A.G 1274 B-
- Adapter , e.g. -V.A.G 1274/8-
- Hose clamps up to ∅ 25 mm - MP7-602 (3094)-
- Pliers for spring-type clips
- Adaptation hose 1.5 m x ∅ 16 mm

Test condition

- Engine must be warm.

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

Note

If loss of coolant is identified, first perform a leakage test of the cooling system. If no loss is identified, then check the exhaust gas recirculation.

– Check cooling system for leaks
⇒ “3.5 Check cooling system for leaks”, page 179 .

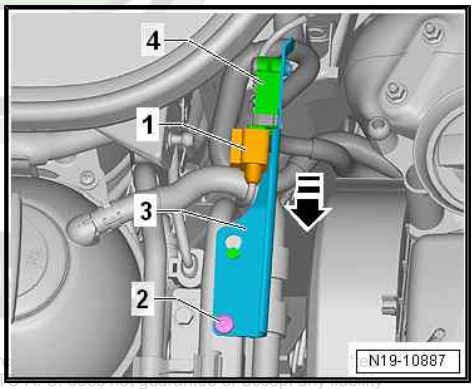
If you identify a leak, it must be removed.

Vehicles with additional fuel pump - V393- or fuel pump 2 - V277-

– Disconnect the plug -1- at the differential pressure sender - G505- -4-.

– Unscrew bolt -2-.

– Slide the mounting bracket -3- of the differential pressure sender - G505- in -direction of arrow- out of the guide.



Caution

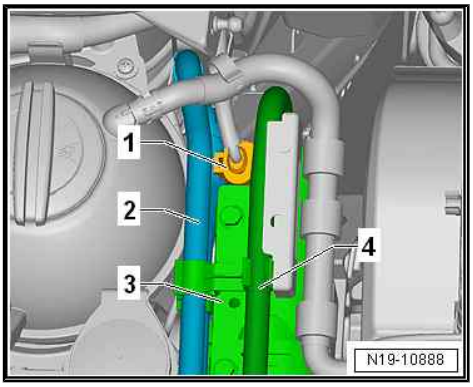
Risk of damage!

- ***The differential pressure indicator - G505- is very sensitive. It must not touch somewhere when laying it down.***

– Place mounting bracket -3- to the side with connected cables.

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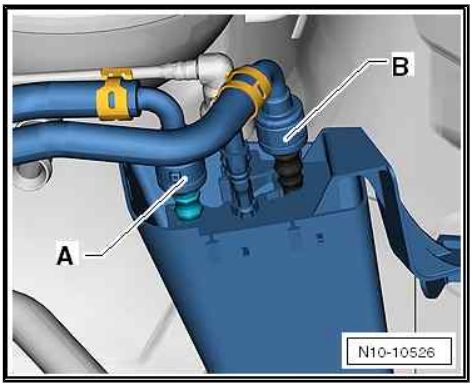
– Disconnect plug connection -1-.
– Push fuel lines -2- out of the mounting bracket -3-.
– Push hose -4- out of the mounting bracket -3-.



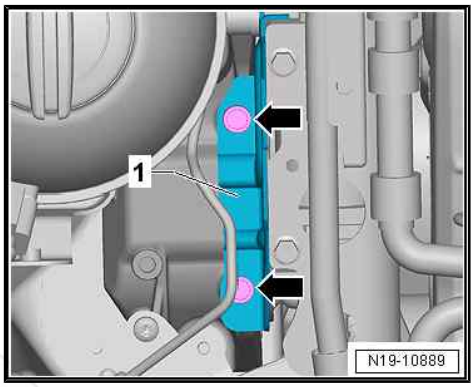
WARNING

Fuel feed line is pressurised. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

– Open quick couplings -A- and -B- of the fuel lines and disconnect fuel lines
⇒ “2.10 Separating push-on couplings”, page 208 .
– Lay the fuel hoses to the side.

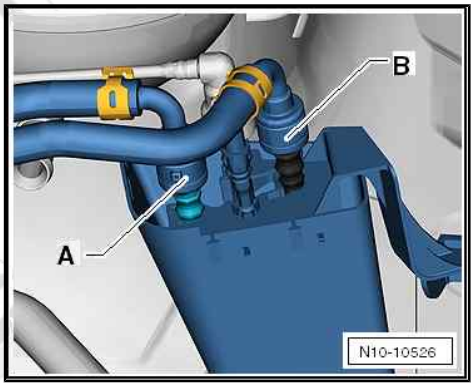


– Remove screws -arrows-.
– Place additional fuel pump - V393- or fuel pump 2 - V277- -1- to the side with connected lines.



Vehicles without additional fuel pump - V393- or fuel pump 2 - V277- .

– Open quick couplings -A- and -B- of the fuel lines and disconnect fuel lines
⇒ “2.10 Separating push-on couplings”, page 208 .

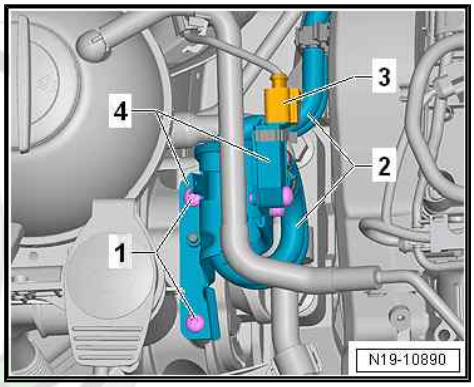


WARNING

Fuel feed line is pressurised. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

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– Unlock the plug -3- at the differential pressure sender - G505- -4-.
– Remove hoses -2- from the holders.



Caution

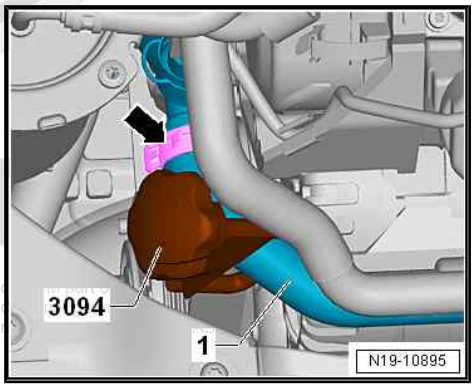
Risk of damage!

- *The differential pressure indicator - G505- is very sensitive. It must not touch somewhere when laying it down.*

– Unscrew screws -1- and put the differential pressure sender - G505- -4- with connected cables to one side.

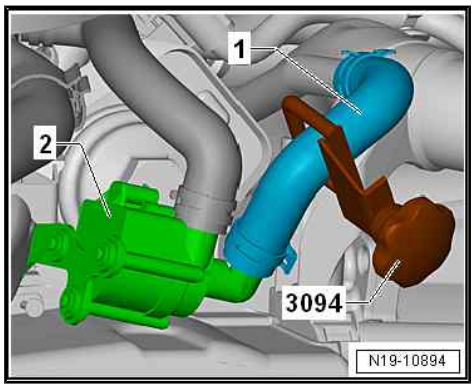
Continued for all vehicles

– Close hose -1- with the hose clamp up to ∅ 25 mm - MP7-602 (3094)- .



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– Close hose -1- with the hose clamp up to ∅ 25 mm - MP7-602 (3094)- for coolant recirculation pump 2 - V178- .

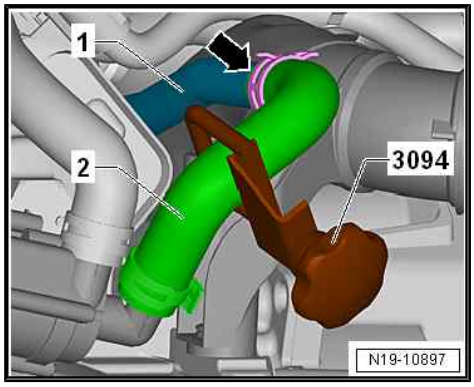


WARNING

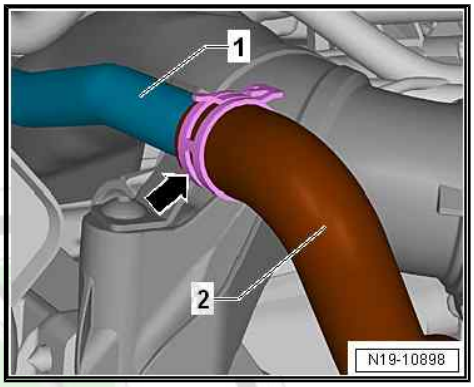
When opening the expansion reservoir, out hot steam or hot coolant may escape.

- *Wear safety goggles and safety clothing to avoid eye injuries and scalding.*
- *Cover the cap with a cloth and open carefully.*

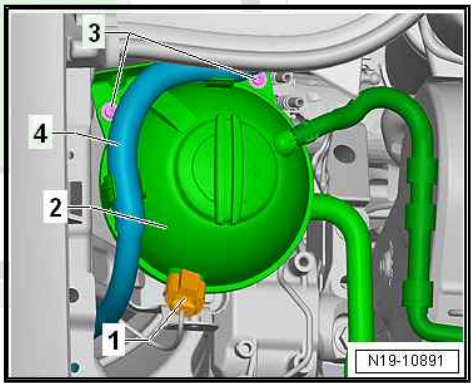
– Open clamp -arrow-.
– Pull coolant hose -2- off coolant pipe -1-.
– Open coolant expansion reservoir.
– Place the disconnected coolant hose in a suitable container.
– Open the hose clamps up to ∅ 25 mm - MP7-602 (3094)- and drain coolant from the coolant expansion reservoir.



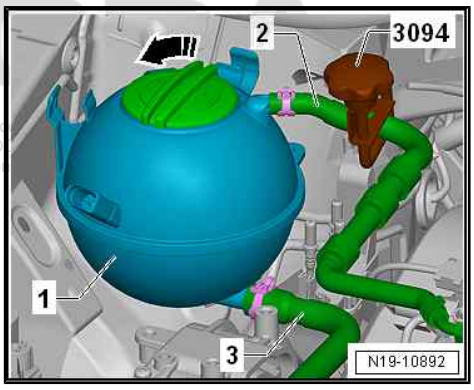
– Connect a suitable adaptation hose -2- to the coolant pipe -1-.



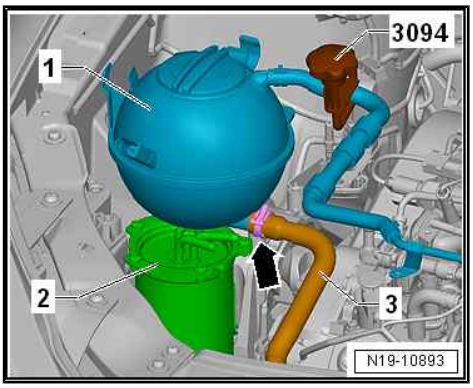
– Disconnect plug -1- from coolant expansion reservoir -2-.
– Disconnect the electric cable -1- and place to one side.
– Unscrew screws -3- and put the expansion reservoir -1- to one side.



– Close hose -2- with the hose clamp up to ∅ 25 mm - MP7-602 (3094)- .
– Open clamp and disconnect hose -3-.
– Close hose -3- with the hose clamp up to ∅ 25 mm - MP7-602 (3094)- .



– Connect the adaptation hose -3- to the free connection of the coolant expansion reservoir -1- and secure with a clamp.
– Place coolant expansion reservoir -1- on the fuel filter -2-.



– Top up the coolant expansion tank with coolant up to the »min.« marking -arrow-.

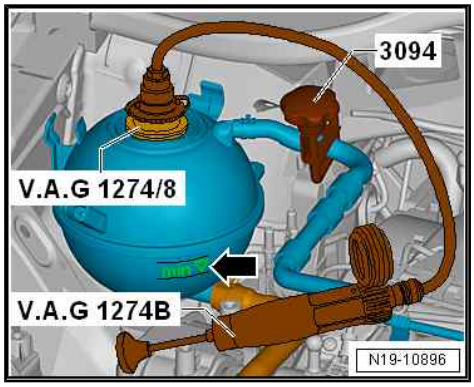
– Screw the adapter - V.A.G 1274/8- into the coolant expansion reservoir.

– Connect the connecting piece - V.A.G 1274 B/1- to the adapter - V.A.G 1274/8- .

– Connect the connecting piece - V.A.G 1274 B/1- to the cooling system testing device - V.A.G 1274 B- via the supplied connecting hose.

– Use the hand vacuum pump of the cooling system tester - V.A.G 1274 B- to generate an overpressure of approx. 0.15 MPa (1.5 bar).

- The pressure must not drop below 0.02 MPa (0.2 bar) after 10 minutes.



If the pressure falls below 0.02 MPa (0.2 bar):

– Check that hose clamps up to ∅ 25 mm - MP7-602 (3094)- are clamp firmly or tighten up.

– Repeat pressure test ⇒ page 348 .

If the pressure again falls below 0.02 MPa (0.2 bar):

The radiator for exhaust gas recirculation is leaking and must be replaced
⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348 .

If the pressure does not fall below 0.02 MPa (0.2 bar) again:

Radiator for exhaust gas recirculation is leak-tight.

WARNING

Risk of scalding!

- *Before the cooling system testing device - V.A.G 1274 B- is separated from the connecting hose or the connecting piece - V.A.G 1274 B/1- , the existing pressure must absolutely be released.*
- *For this step, press the pressure relief valve on the cooling system testing device - V.A.G 1274 B- and hold it pressed until the pressure gauge indicates the value »0«.*

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– Connect all hoses again and secure with clamps.

– Top up coolant
⇒ “1.3 Draining and filling coolant”, page 160 .

2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve - N18-

Special tools and workshop equipment required

- Hose clamps up to ∅ 25 mm - MP7-602 (3094)-
- Catch pan , e.g. -VAS 6208-
- Pliers for spring-type clips
- Old oil collecting and suction equipment , e.g. -V.A.G 1782-

Removing

Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- *Lay lines of all kinds (for example, for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- *To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.*

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

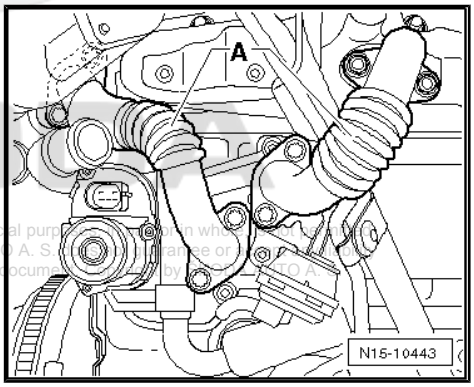
– Remove air filter with air mass meter - G70-
⇒ “3.6 Removing and installing air filter”, page 309 .

– Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .

– Remove pre-exhaust pipe:

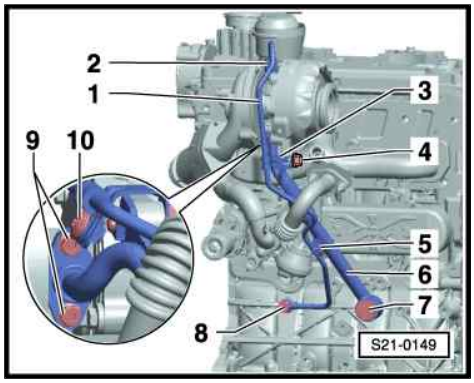
- Engine identification characters CFFB, CFGB, CFHA, CFHC, CFHF, CFJA
⇒ “1.5 Removing and installing pre-exhaust pipe with particle filter”, page 327 .
- Engine identification characters CLCA, CLCB, CLJA
⇒ “1.6 Removing and installing pre-exhaust pipe with catalytic converter”, page 331 .

– Remove connection pipes -A- of cylinder head and exhaust manifold.



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Vehicles with front-wheel drive



- Unscrew the union nut -2- of the oil feed line -1-. At the same time counterhold the hexagon of the connection fitting using the key - T10461- .
- Unscrew screws -4- and -9-.
- Release hollow screws -7- and -8-.
- Remove the support for exhaust gas turbocharger -6- with oil return pipe and oil feed pipe -1-.

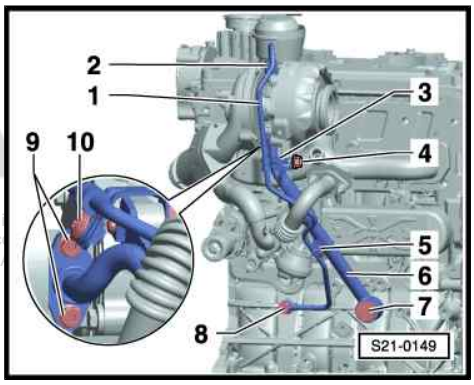
Vehicles with four-wheel drive

- Remove flange shaft to right of angle gearbox ⇒ Gearbox; Rep. gr. 39 ; Differential; Removing and installing right flange shaft .

Note

The oil feed line remains attached on the cylinder block. Otherwise the angle gearbox must be removed.

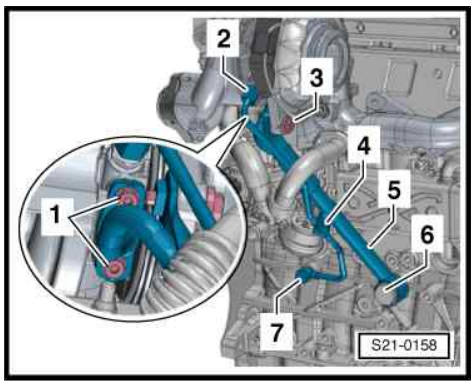
Vehicles with four-wheel drive and engine codes CFFB, CFHC, CFHF, CLCB



- Unscrew screws -5- and -10-.
- Unscrew the union nut -2- of the oil feed line -1-. At the same time counterhold the hexagon of the connection fitting using the key - T10461- .
- Bend oil feed line -1- of turbocharger (do not slacken hollow screw -8-).
- Unscrew screws -4- and -9-.
- Release hollow screw -7-.
- Remove support for exhaust gas turbocharger -6- with oil return pipe.

If required, remove bracket between bevel box and cylinder block ⇒ Gearbox; Rep. gr. 34 .

Four-wheel drive vehicles with engine codes CFGB, CFJA



- Unscrew screw -4- for clamping the oil feed line.
- Unscrew union nut -2-. At the same time counterhold the hexagon of the connection fitting using the wrench - T10461- .
- Bend oil feed line of turbocharger (do not slacken hollow screw -7-).
- Release screws -1- and -3- and hollow screw -6-.
- Remove support for exhaust gas turbocharger -5- with oil return pipe.

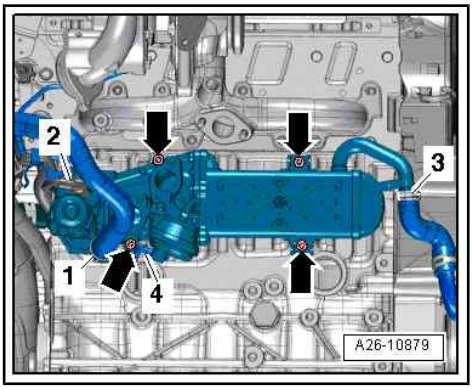
If required, remove bracket between bevel box and cylinder block ⇒ Gearbox; Rep. gr. 34 .

Continued for all vehicles

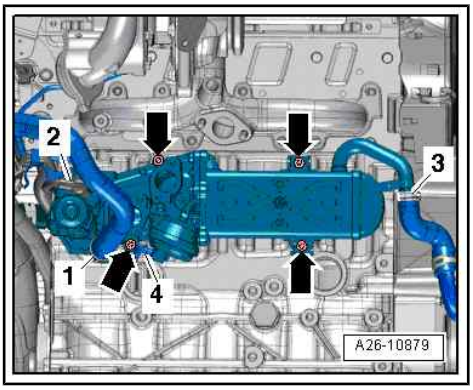
- Collect escaping engine oil with the old oil collecting and suction equipment - V.A.G 1782- .

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– Pinch off the coolant feed hose and the coolant return hose for the radiator of the exhaust gas recirculation with hose clamps - MP7-602 (3094)- and detach the hoses -1- and -3-.
– Disconnect plug connection -2-.
– Remove vacuum hose -4- from vacuum setting element and lay down.
– Release screws -arrows- and remove radiator for exhaust gas recirculation.
– Collect escaping coolant with the catch pan - VAS 6208- .



– Release screws -arrows- and remove radiator for exhaust gas recirculation with exhaust gas recirculation valve - N18- .



Installing

Assembly is carried out in the reverse order. When installing, observe the following:

- Replace the gaskets, the sealing rings and the self-locking nuts.
- Secure all hose connections with spring strap clamps.

– Check the level of coolant and top up if necessary ⇒ “1.3 Draining and filling coolant”, page 160 .

Note

When replacing the radiator, replace all the coolant
⇒ “1.3 Draining and filling coolant”, page 160

If the cooler for exhaust gas recirculation was replaced, carry out basic setting ⇒ Vehicle diagnostic tester.

– Select “Self-test”.
– Select “Drive”.
– Select “01 - CFFB, CFGB ... engine -J623”.
– Select “01 - Engine electronics functions”.
– Select “01 - Basic setting (repair group 23)”.

Tightening torques - summaries of components

- Screws for radiator for exhaust gas recirculation ⇒ “2.1 Summary of components - Exhaust gas recirculation with radiator”, page 340 .
- Screws for oil line for exhaust gas turbocharger ⇒ “1 Exhaust gas turbocharger”, page 232 .

2.4 Checking change-over flap for radiator for exhaust gas recirculation

Special tools and workshop equipment required

- Hand vacuum pump , e.g. -VAS 6213-

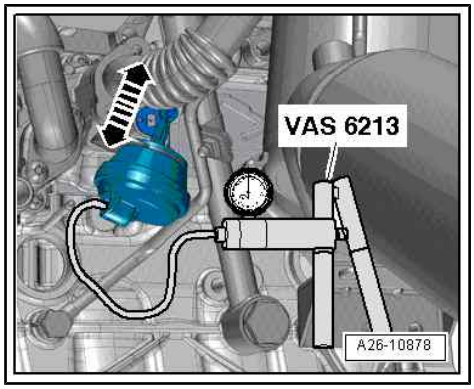
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Work procedure

Note

The vacuum setting element for change-over flap is accessible from below.

– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .
– Unbolt heat shield for right drive shaft.
– Detach vacuum hose from vacuum setting element.
– Connect hand vacuum pump to vacuum setting element.
– Actuate the hand vacuum pump in order to generate negative pressure.
• The vacuum setting element must open the change-over flap up to the stop at maximum 0.08 MPa (0.8 bar) negative pressure and in case of ventilation close it up to the stop -arrows-.



Note

- *For this test the opening of the change-over flap can be performed in jolts. In driving mode the change-over flap opens due to the larger negative pressure.*
- *The closing of the change-over flap must be carried out suddenly when ventilating (e.g. detach vacuum hose).*

If the vacuum setting element does not open or close the change-over flap up to the stop:

– Replace radiator for exhaust gas recirculation with vacuum setting element
⇒ “2.3 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve N18 ”, page 348 .

2.5 Clean exhaust gas recirculation system

⇒ “2.5.1 Initiate cleaning process of the exhaust gas recirculation system”, page 353

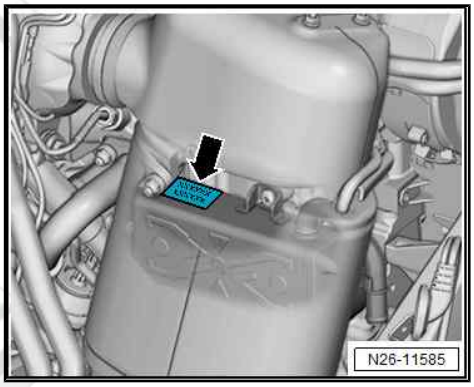
⇒ “2.5.2 Clean connecting pipes and pipe sockets”, page 358

Note

Cleaning is only available for exhaust gas recirculation modules from part number - 03L 131 512 DQ/DP- .

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– Before starting work, check the part number -arrow- with endoscope (eg VAS 6748A / 1).



Explanation

Some extreme driving profiles (eg short-distance) can cause lacquering or coking inside the exhaust gas recirculation cooler. In this case, the exhaust warning lamp lights up in the dash panel insert, the event memory contains the codes:

- P0401 "EGR system throughput too small"
- P046C,“exhaust gas recirculation encoder 1, implausible signal”

In most cases, this coking can be eliminated by the rinsing or cleaning process described below
⇒ “2.5.1 Initiate cleaning process of the exhaust gas recirculation system”, page 353 .

2.5.1 Initiate cleaning process of the exhaust gas recirculation system

Special tools and workshop equipment required

- Coolant flushing system for exhaust gas recirculation - VAS 542 007-

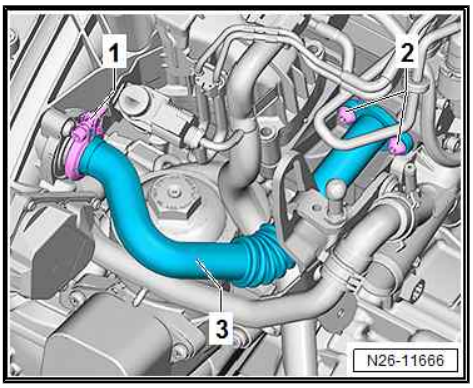


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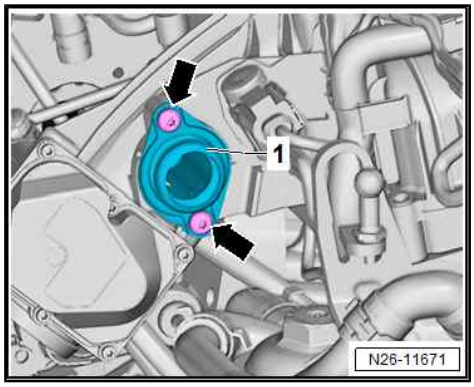
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .

– Open clamp -1- and remove.

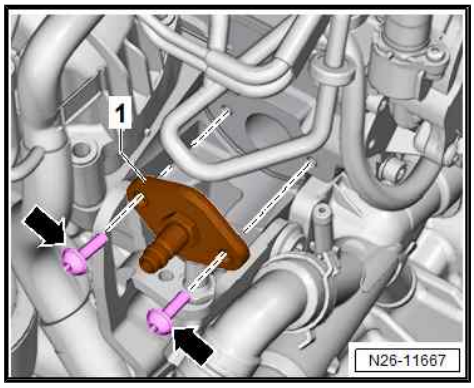
– Remove screws -2- and connecting pipe to the intake manifold -3-.



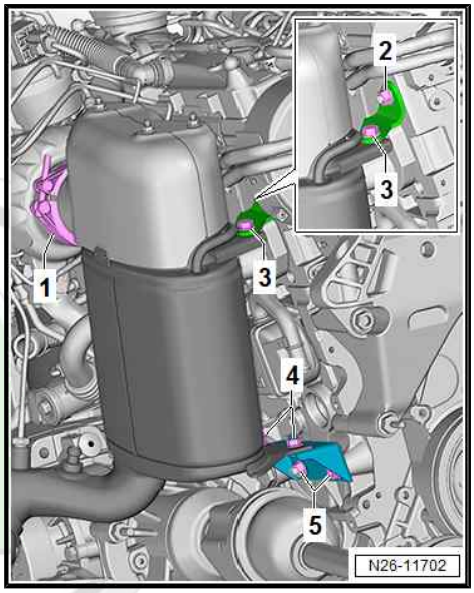
– Remove screws -arrows- and remove support -1- from the suction pipe.



– Fit the adapter - VAS 542 007/4- -1- onto the opening on the cylinder head.
– Insert the original screws -arrows- for the connecting pipe and tighten by hand. Make sure that the seal on the adapter is not pinched.

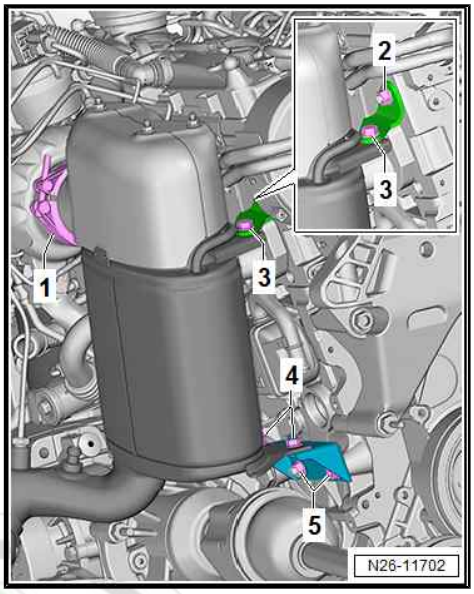


– Unscrew bolt -3-.
– Remove noise insulation ⇒ Body Work; Rep. gr. 50 .

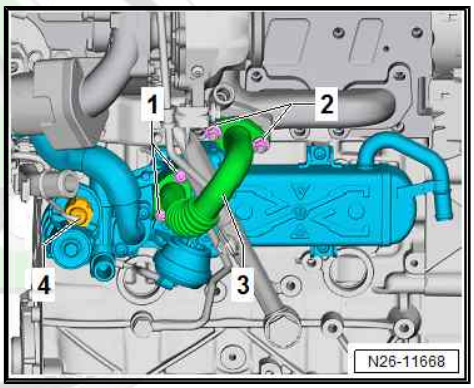


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– Release nuts -4- and screws -5- and remove bracket.
– Open the clamp -1- and push the particle filter to the side.



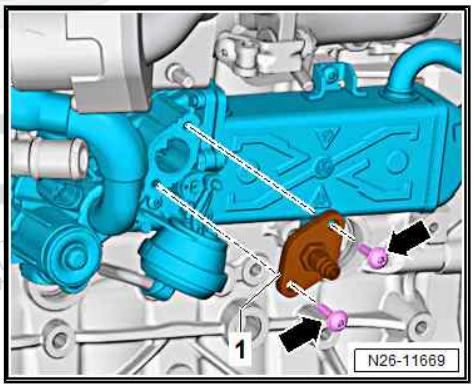
– Release the screws -1- and then the nuts -2-.
– Remove connecting pipe -3- between the exhaust manifold and radiator for exhaust gas recirculation.
– Disconnect plug -4- on the exhaust gas recirculation valve - N18- .



Note

For better illustration, the prop for turbocharger is removed on the image. Expanding the support is not required.

– Fit the adapter - VAS 542 007/4- -1- onto the opening on the exhaust gas recirculation cooler.
– Insert the original screws -arrows- for the connecting pipe and tighten by hand. Make sure that the seal on the adapter is not pinched.
– Connect the supply hose - VAS 542 007/2-2- of the cleaning device to the adapter on the exhaust gas recirculation cooler.
– Connect the return hose - VAS 542 007/2-3- of the cleaning device to the adapter on the cylinder head.



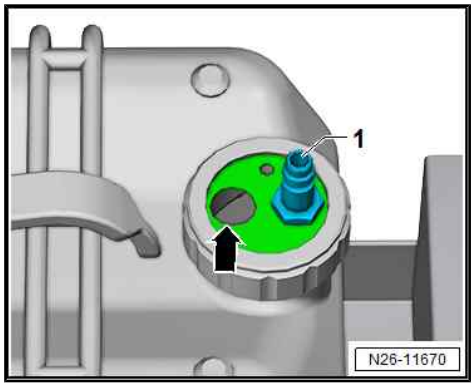
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– Connect the battery charger to the vehicle battery.
– Connect the pole clamps of the valve disc - VAS 542 007/6- to the vehicle battery.
– Connect the pole clamps for the pump - VAS 542 007/3- to the vehicle battery.

Prepare Coolant flushing system for exhaust gas recirculation - VAS 542 007-

– Fill the canister - VAS 542 007/1- with 9 litres of warm (about 40 °C - 50 °C) tap water.
– Fill 1 litre of cleaner - D 600 200 A2- in the canisters.

– Connect the pump suction hose - VAS 542 007/2-1- -1- to the canister lid with the connection.
– Feed the open end of the Return hose - VAS 542 007/2-3- into the opening -arrow- of the canister lid to about half of the canister height.
– Attach the plug of the valve disc - VAS 542 007/6- to the Exhaust gas recirculation valve - N18- .
– Switch on the valve disc - VAS 542 007/6- to open the exhaust gas recirculation valve - N18- .



Note

- *Make sure that the tap of the relief valve on the supply hose is closed.*
- *If activation of the exhaust gas recirculation valve via the valve disc - VAS 542 007/6- including the supplied pressure of about 0.16 MPa (1.6 bar) from the pump - VAS 542 007/3- is not sufficient to open the exhaust gas recirculation valve - N18- , the pump switches off after a short time. In this case, the exhaust gas recirculation valve - N18- mechanically defective and the exhaust gas recirculation module must be replaced. Before disconnecting the supply hose, the pressure must be relieved by carefully opening the tap on the relief valve and collecting cleaning solution.*

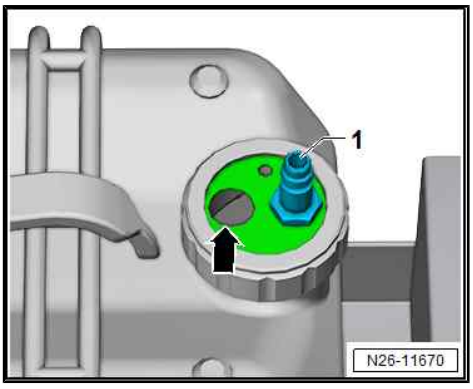
– Clean the connecting pipes and the intake manifold during the cleaning process
⇒ “2.5.2 Clean connecting pipes and pipe sockets”, page 358 .
– Operate the pump - VAS 542 007/3- as follows:

Pump - VAS 542 007/3-	Time	Action
Switching on	25 min	Cleaning
Switching off	10 min	Influence of the cleaning solution
Switching on	25 min	Cleaning
Switching off	---	End of the cleaning process

– Disconnect the suction hose from the canister, switch on the pump until no more cleaning solution is pumped (emptying the system).
– Pull the return hose out of the canister, making sure that no cleaning solution escapes.
– Empty the canister, observe the corresponding disposal regulations.
– Fill canister with 9 litres of warm (about 40 °C - 50 °C) tap water.
– Connect the pump suction hose - VAS 542 007/2-1- to the canister lid with the connection.
– Feed and fix the return hose - VAS 542 007/2-3- into a suitable vessel (minimum 12 litre capacity).
– Switch on the pump - VAS 542 007/3- until the contents of the canister have fully completely through the exhaust gas recirculation system.

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– Release the supply hose - VAS 542 007/2-2- and disconnect from adapter for exhaust gas recirculation cooler.
– Connect the compressed air adapter - VAS 542 007/5- to the adapter on the exhaust gas recirculation cooler.
– Feed the open end of the Return hose - VAS 542 007/2-3- into the opening -arrow- of the canister lid to about half of the canister height.

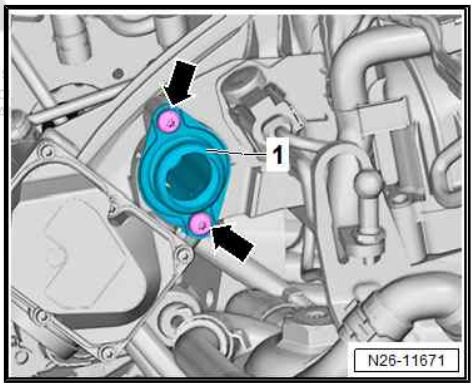


• The pump suction hose - VAS 542 007/2-1- must be connected -1- to the canister lid.
– Connect the compressed air line to the compressed air adapter - VAS 542 007/5- and fully blow off the residual water from the exhaust gas recirculation system.

Caution

The water must be completely removed from the exhaust gas recirculation system. Otherwise, it can lead to engine damage.

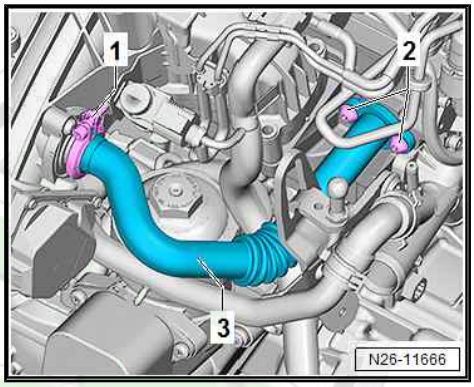
– Release the compressed air adapter - VAS 542 007/5- and disconnect from the adapter on the exhaust gas recirculation cooler.
– Remove the adapter - VAS 542 007/4- from the exhaust gas recirculation cooler.
– Install the connecting pipe between the exhaust manifold and the exhaust gas recirculation cooler with new seals and new nuts
⇒ “2.1 Summary of components - Exhaust gas recirculation with radiator”, page 340 .
– Remove the plug of the valve disk - VAS 542 007/6- from the exhaust gas recirculation valve - N18- and attach the original plug.
– Move and fix the particle filter into its installation position with a new seal and a new clamp
⇒ “1.1 Summary of components - pre-exhaust pipe”, page 316 .
– Install the noise insulation ⇒ Body Work; Rep. gr. 50 .
– Release the return hose and remove it from the adapter on the cylinder head.
– Inset the support -1- into the intake manifold, the opening of the nozzle points to the throttle valve control unit.



– Insert screws -arrows- and tighten to 9 Nm.
– Remove the adapter - VAS 542 007/4- from the cylinder head.

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– Install connecting pipe -3- with new seal
⇒ “2.1 Summary of components - Exhaust gas recirculation with radiator”, page 340 .
– Install the engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .
– Check cleaning effectiveness with ⇒ Vehicle diagnostic tester.



♦ `Drivetrain`
♦ `01 – Self-diagnosable systems`
♦ `01 - Diesel direct injection and glow plug system EDC 17`
♦ `01 - Engine electronics functions`
♦ `01 - Check exhaust gas recirculation valve 1 -GX5- after cleaning according to rep. guide`

– Perform a test drive
– Query event memory and erase entries if required ⇒ Vehicle diagnostic tester.

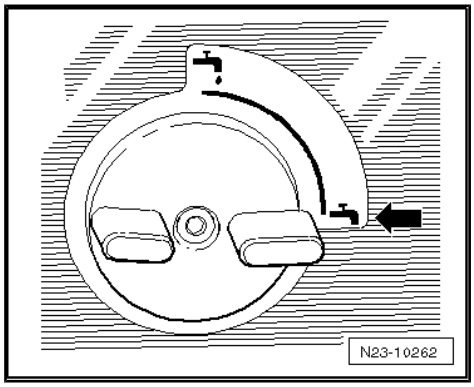
2.5.2 Clean connecting pipes and pipe sockets

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Special tools and workshop equipment required

♦ Ultrasonic cleaning device - VAS 6418-

– Close the drain cock -arrow- of the ultrasonic cleaning device - VAS 6418- on the right side of the housing.

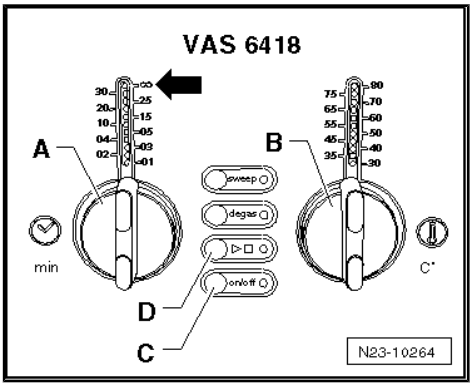


Note

The heating process of the ultrasonic bath can be accelerated when using warm tap water.

– Fill the ultrasonic cleaner - VAS 6418- with 1800 ml of tap water and 200 ml cleaner - D 600 200 A2- .
– Insert connecting pipes and pipe sockets, temporarily change the position of the connecting pipes in the bath if required.

– Turn on the cleaning device by pressing the button on / off -C-.
– Turn the temperature rotary switch -B- until the light is at 40 ° C heating temperature.
– Set the rotary switch for operating time -A- on “10” -arrow-.
– ▶ -D- Press for more than 2 seconds and put the device into operation.



Note

Temperature-controlled cleaning is now switched on. During the heating time, the ultrasound is switched on at intervals for circulating the cleaning liquid. After reaching the preselected temperature, the ultrasound is switched on permanently. The duration of cleaning must be at least 10 minutes, and only begins when a temperature of at least 40 °C has been reached.

– After cleaning, rinse connecting pipes and pipe sockets with clean water and blow out with compressed air.

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28 – Glow plug system

1 Glow plug system

⇒ “1.1 Removing and installing glow plugs”, page 360

1.1 Removing and installing glow plugs

Note

Metal glow plugs are installed in this engine.

Special tools and workshop equipment required

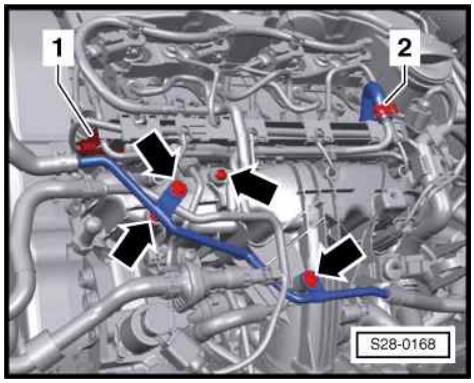
- Flexible-head wrench SW 10 , e.g. -3220-
- Release tool - T10236-
- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves

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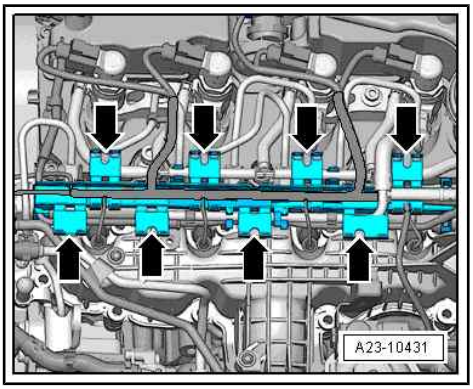
Removing

Observe all safety measures and notes for assembly work on the fuel system and on the injection system as well as the rules for cleanliness
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 ,
⇒ “3.3 Regulations concerning cleanliness when working on the fuel supply/fuel injection system”, page 6 .

– Switch off ignition and pull out ignition key.
– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 11 .
– If present, remove the noise insulation at the injection units.
– Disconnect plug -1- at fuel pressure sender - G247- .
– Release fixing screws -arrows- of top coolant pipe and the fuel return-flow pipe.
– Detach the hose -2- from the fuel return-flow line.



– Open the catches of the wiring -arrows- and expose the wiring loom.



Caution

- *Carefully disconnect the plug from the glow plugs.*
- *If the plug is damaged when disconnecting it, the complete wiring loom including the plugs must be replaced (plugs cannot be replaced separately).*

– Carefully disconnect the plug from the glow plugs using the release tool - T10236- .

WARNING

Wear protective gloves and protective goggles when working with grease remover!

– Clean the glow plug and the hole in the cylinder head with great care.

Note

No dirt must get into the cylinder.

When cleaning, for example:

1. Suction off heavy dirt using a vacuum cleaner.
2. Spray grease remover and cleaning agent onto the glow plug and into the hole around the plug, let it take effect for a short period of time and blow out with compressed air.
3. Clean the glow plug and the channel around the plug with a cloth soaked in oil.

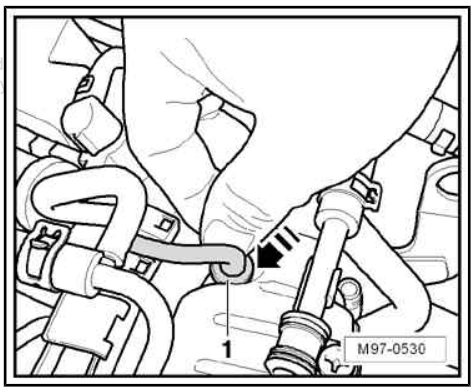
– Slacken the glow plug with a flexible-head wrench 10 - 3220- and release.

Installing

Installation is carried out in the reverse order; pay attention to the following points:

– Screw in the glow plug with a flexible-head wrench 10 - 3220- and tighten.

– Fit the plug -arrow- again onto the relevant glow plugs and check for firm seating.



– Querying and erasing event memory of engine control unit ⇒ Vehicle diagnostic tester.

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Tightening torques - summaries of components

Component	Nm
Glow plug	18 Nm